

INTER-AMERICAN TROPICAL TUNA COMMISSION

MINUTES OF THE 61ST MEETING

La Jolla, California, USA

June 10-12, 1998

The 61st meeting of the Inter-American Tropical Tuna Commission (IATTC) was held in La Jolla, California, USA, on June 10-12, 1998.

1. Opening of the meeting

The meeting was called to order by the Chairman, Dr. Michael F. Tillman, on June 10 at 10:30 a.m. He then called on the heads of the delegations to introduce themselves and the other members of their delegations. These, and also observers and IATTC staff members who were not introduced, are listed in Appendix 1 of these minutes.

2. Adoption of agenda

The Chairman asked if there were any comments on the provisional agenda. There were none, so it was considered to be approved. The Agenda is attached as Appendix 2 of these minutes.

3. Review of current tuna and billfish research

The Chairman called upon Dr. James Joseph, Director of the IATTC, to present information on this subject. Dr. Joseph said that the IATTC staff conducts a wide variety of research to fulfill its mandate under the convention, but that, due to time constraints, it would be possible to describe only a few projects. He then turned the floor over to Dr. Richard B. Deriso, head of the IATTC's Tuna-Billfish Program, to present some highlights of this program.

Dr. Deriso said that it had been widely believed that skipjack seldom, if ever, spawn in the eastern Pacific Ocean (EPO). A preliminary study carried out by the IATTC staff, however, indicated that there is considerable spawning of skipjack in the EPO, so a 2-year sampling program, during which data from 4,000 females were collected, was conducted. The samples were gathered at sea on large tuna purse seiners by observers whose principal duties were to collect data for the IATTC's Tuna-Dolphin Program. Preliminary analyses of the data indicate that there is considerable spawning of skipjack from the coast of the Americas to about 130°W between about 15°N and 10°S.

He then discussed recent progress at the IATTC's Achotines Laboratory. In December 1993 an agreement was reached by the Overseas Fishery Cooperation Foundation (OFCF) of Japan, the government of the Republic of Panama, and the IATTC to undertake a joint five-year project, funded mostly by the OFCF, at the Achotines Laboratory. The objectives of the project are: (1) to culture adult yellowfin tuna to supply larvae and juveniles for research on its early life history; (2) to produce food organisms for the larval and juvenile tunas; and (3) to culture broodstock snappers (Lutjanidae), corvina-like fishes (Sciaenidae), and food organisms for their larvae

and juveniles. Considerable success has been achieved with all of these objectives, and in 1997 it was agreed that the project would be extended for an additional two years.

Dr. Deriso then discussed some studies the staff was making on longline fishing. He talked about the longline fishing effort and the apparent abundance of bigeye tuna in the EPO, the area around Hawaii, and other parts of the central Pacific Ocean. The effort and catch per unit of effort (CPUE) vary seasonally around Hawaii. The effort decreased and the CPUE increased in the EPO during the 1985-1987 period. The staff's studies of swordfish and other billfishes in the EPO include collecting tissue samples and assembling data on catch, effort, CPUE, and length distributions of the catches by the longline fisheries of the Latin American nations.

He then spoke briefly about current attempts to model the purse-seine fishery for tunas in the EPO. The predicted results are close to the actual results, which indicates that the model is valid.

Dr. Deriso then introduced Mr. Forrest R. Miller, who talked about the El Niño episode of 1997-1998. Mr. Miller said that this episode was slightly stronger than that of 1982-1983, which, until now, had been the strongest episode of the 20th century. It brought abnormally high sea-surface temperatures and deeper thermoclines to the waters off northern South America and heavy rains to coastal areas of Ecuador and Peru. He showed four slides, one each of sea-surface temperatures (SSTs) for November 1996 (normal conditions), SSTs and SST anomalies for November 1997 (strong El Niño conditions), and SST anomalies for May 1998 (strong, but weakening, El Niño conditions). The surface isotherms off Peru were closer together during normal conditions than during El Niño conditions. Mr. Miller said that the El Niño was weakening at the time of IATTC meeting, but would not dissipate until after the third quarter of 1998.

Dr. Deriso then introduced Dr. Michael G. Hinton, who talked about his work on the ecology of billfishes. Dr. Hinton showed that blue marlin are more numerous in sets made on tunas associated with floating objects than in other types of sets. The incidence of blue marlin increases with the weight of fish of all species caught in floating-object sets and sets made on unassociated tunas, but such is not the case for sets made on tunas associated with dolphins. Blue marlin, bigeye, and whitetip shark are caught most often during the morning, whereas black skipjack are caught most often during the afternoon. He discussed a study of areas which are considered to be suitable striped marlin habitat and areas in which striped marlin are caught by purse seiners. These occur most often in the same 2° by 5° rectangles off northern South America from the coast to about 120°W.

Dr. Deriso next introduced Professor Felipe Galván-Magaña of the Centro Interdisciplinario de Ciencias Marinas, Instituto Politécnico Nacional, La Paz, Mexico, who is working with Dr. Robert J. Olson of the IATTC staff on the trophic interactions of yellowfin tuna, dolphins, and associated predators in the EPO. The purposes of this study are (1) to obtain an understanding of the trophic interactions of the various species, which will be useful for evaluation of natural fluctuations in abundance of tunas and billfishes, and (2) to determine whether the association between yellowfin tuna and dolphins is based on food. Professor Galván spoke about the feeding habits of yellowfin tuna, spotted and spinner dolphins, various species of billfishes, various species of sharks, wahoo, and mahi-mahi, with regard to areas, times of day, types of set, and types of food consumed.

Dr. Deriso then introduced Dr. Olson, who talked about activities at the IATTC's Achotines Laboratory. Dr. Olson talked mainly about the spawning of yellowfin in tanks at that laboratory and studies performed on larvae resulting from that spawning. Spawning has been continuous since October 1996, except for periods early in the year when the water temperatures are too low. Studies are currently in progress on (1) techniques for rearing the larvae and juveniles, (2) growth of the larvae and juveniles, (3) measurement of the advantages of early conversion to a fish diet, (4) effects of turbulence on the survival of the larvae, and (5) spawning behavior of the adult fish. The growth rate of the larvae increases when they switch from a diet of small crustaceans to a diet of small fish. (In general, rapid growth is an advantage because it reduces the chances becoming the victim of a predator.) The survival of the larvae is greatest when the turbulence of the water is moderate.

4. The 1997 fishing year

The Chairman then asked Dr. Joseph to speak about this subject. Dr. Joseph said that the catches of tunas in the EPO during 1997 were the greatest on record, with surface catches of about 260 thousand metric tons of yellowfin, 160 thousand metric tons of skipjack, 50 thousand metric tons of bigeye, and smaller amounts of other species. In addition, about 12 to 15 thousand metric tons of yellowfin were caught by longliners in the EPO. The 1998 catches of yellowfin, skipjack, and bigeye have been less, so far, than those of 1997, even though the fleet is larger now than it was in 1997. The reduced catches during 1998 may be due to the El Niño event which began in mid-1997 and has persisted through the first half of 1998. (During El Niño events the thermocline is deeper in the affected areas, which makes the fish less vulnerable to capture by surface gear.) He discussed the areas where yellowfin, skipjack, and bigeye were caught by surface gear during 1997. Yellowfin were caught mostly north of 5°N from the coast to 140°W and south of 5°N from the coast to 95°W. Skipjack were caught mostly from the coast to 140°W between 20°N and 15°S, except for an area off southern Mexico and northern Central America which was nearly devoid of skipjack. Bigeye were caught mostly between 5°N and 10°S from the coast to 130°W. The annual catches of bigeye by surface gear increased greatly during the 1990s, from less than 5 thousand metric tons during 1985-1989 to more than 50 thousand metric tons during 1996 and 1997. This increase was due to the development of new techniques employing fish-aggregating devices (FADs).

5. Status of tuna stocks

The Chairman asked Dr. Joseph to discuss the status of tuna stocks in the EPO.

Dr. Joseph said that two indices of abundance of yellowfin showed that the abundance had decreased from the late 1960s to the early 1980s, then increased until the mid-1980s, and had since leveled off or decreased slightly. The decrease during the 1970s was due to a switch from fishing for medium-sized tunas associated with dolphins to small tunas associated with floating objects which, in turn, was caused by an excess of fishing effort.

Two types of models, production models and age-structured models, are used to assess the condition of yellowfin in the EPO. Only catch, effort, and CPUE data for a series of years during which there was considerable variation in fishing effort and catches are required for production modeling. Production modeling indicates that the maximum sustainable yields of about

270 to 290 thousand metric tons of yellowfin per year are achievable in the EPO with effort of about 19 thousand Class-6 purse-seiner days per year. Data on the sizes and age structure of the fish in the catch are required for age-structured modeling. Age-structured modeling is based on the fact that initially a cohort of fish consists of enormous numbers of very small fish which increase in size, but decrease in numbers due to natural mortality, as time passes. Initially the gains due to growth exceed the losses due to natural mortality, so the total weight of the cohort increases. Later, however, the losses due to natural mortality exceed the gains due to growth, and the total weight decreases. Eventually the cohort disappears. The yield per recruit can be maximized by catching the fish at an intermediate size, when the total weight of the cohort is approaching its maximum size. During the 1970s, when a large portion of the fishing effort was directed at small tunas associated with floating objects, the yields per recruit were much less than they were from the mid-1980s to the present, when more of the effort has been directed at larger tunas associated with dolphins. The yellowfin stock is basically in good shape, although the average size of fish caught has decreased, which has reduced the productivity of the stock by about 9 percent. The staff is concerned about the increases in fleet capacity during recent years which could cause a return to the conditions of the 1970s. From 1970 to 1976 the fleet capacity increased from about 100 thousand to 167 thousand metric tons. Due to severe competition for fish, a large portion of the fleet concentrated on small yellowfin, and the CPUEs decreased to less than half the CPUEs of the 1960s or the mid-1980s to the present. From 1976 to 1982 the catch of yellowfin declined from 261 thousand to 138 thousand metric tons. Accordingly, the staff is recommending a quota for the Commission's Yellowfin Regulatory Area (CYRA) of 210,000 metric tons of yellowfin, with up to three increments of 15,000 metric tons each, to be added at the discretion of the Director. No regulations are recommended for the area west of the CYRA and east of 150°W because the size composition of the fish caught in this area is close to the size composition which would produce the maximum yields per recruit. Special attention should be directed to the area south of 5°N, however, as the catches of small yellowfin seem to be increasing in that area.

The world catches of skipjack exceed those of any other species of tuna. Skipjack of the EPO mingle freely with those of the central Pacific Ocean. Yield-per-recruit analyses indicate that increasing the minimum size at which skipjack are caught would not increase the catches of this species. There is a strong correlation between the numbers of sets made on tunas not associated with dolphins in the EPO and the catches of skipjack in that area, which may indicate that as skipjack are caught in the EPO they are replaced by immigrants from the central Pacific. The IATTC staff does not believe that there is any need for regulations to protect skipjack in the EPO.

Bluefin apparently spawn only in the western Pacific Ocean. Some of them migrate to the EPO as juveniles, where they are caught by purse seiners off California and Baja California. Those which survive eventually return to the western Pacific to spawn. The numbers of juvenile bluefin which migrate from the western Pacific to the EPO vary from year to year, which is at least partially responsible for the high interannual variability in the catches of bluefin in the EPO. If the catches of bluefin in their first year of life in the western Pacific could be reduced the total catches of bluefin would almost certainly increase.

The catches of bigeye in the EPO are less than those of yellowfin and skipjack, but still of considerable importance. Until the 1990s the catches of bigeye by longline gear, in both weight

and numbers of fish, far exceeded those by surface gear. However, the purse-seine catches of bigeye have exceeded the longline catches of that species in numbers of fish since 1994 and in weight since 1996. The average weight of the fish caught by longliners is about 50 kg, whereas the average weight of those caught by purse seiners dropped from about 12 kg in 1994 and 1995 to about 9 kg in 1996 and then to about 6 kg in 1997. Cohort analyses conducted with trial values of 0.4, 0.6, and 0.8 for the coefficient of annual natural mortality (M) indicate that the biomass of bigeye has declined considerably since the mid-1980s. There is no indication, however, that the biomass has been reduced enough to affect the recruitment. Production modeling carried out for bigeye in the EPO indicates that catches of about the same magnitude can be obtained with a wide range of fishing effort. The IATTC staff, however, believes that the best assessment of this stock will eventually be obtained with cohort analyses. Dr. Joseph described computer simulations which produced estimates of the catches of bigeye by longliners and purse seiners for the 1997-2006 period obtainable with three values of M , 0.4, 0.6, and 0.8, and three patterns of fishing effort, obtained by combining the coefficient of annual fishing mortality for the 1995 longline fishery (F_{LL}) with that for the 1996 surface fishery (F_{PS}) multiplied by 0.1 (Pattern A), 1.0 (Pattern B), and 1.5 (Pattern C). Not surprisingly, the longline catches are greatest with Pattern A. With $M = 0.4$, Patterns B and C both produce reduced catches for the combined surface and longline fisheries.

6. Review of tuna-dolphin research and extension programs

Dr. Joseph turned the floor over to Dr. Martín A. Hall, head of the IATTC's Tuna-Dolphin Program. Dr. Hall said that the Tuna-Dolphin Program includes data collection, a gear program, research on dolphins, and analysis of bycatch data. He pointed out that since the early 1970s the numbers of sets on tunas associated with dolphins, tunas associated with floating objects, and unassociated tunas had varied considerably from year to year. The mortalities of dolphins caused by the fishery had decreased drastically, and now those mortalities are only a small fraction of the estimated numbers of dolphins. The reduced mortalities are the result of reduced mortalities per set, rather than reductions in the numbers of sets on tunas associated with dolphins. The mortalities of all stocks but one, northeastern spotted dolphin, have been less than the target of 0.1 percent of a minimum estimate of the population size of that stock specified in the Declaration of Panama and the Agreement on the International Dolphin Conservation Program. Mortalities most often occur in sets made in strong currents and in sets in which "canopies" are formed in the net. The mortalities per set in both of these types of sets declined precipitously from the mid-1980s to the mid-1990s, but still a large percentage of the mortality is associated with these problems.

Dr. Hall introduced Mr. Alejandro A. Anganuzzi, who described the IATTC staff's estimates of relative abundance of the various stocks of dolphins. The data, which are collected by observers, are biased because the vessel captains, of course, fish in areas where they think their success will be the greatest, rather than distributing their effort in such a way as to obtain the best possible estimates of the abundance of dolphins. This causes problems, especially for stocks whose ranges include areas where there is little or no fishing. Various mathematical techniques are used to minimize the effects of the biases in the original data. The levels of relative abundance of two of the stocks, eastern spinner dolphins and northern common dolphins, were lower in 1997 than in 1996, but this could be due to the strong El Niño event which began in 1997, as the lowest estimates of several of the stocks tend to coincide with El Niño events.

Dr. Hall then talked about studies in progress on bycatches. The principal bycatch species are billfishes, especially sailfish, blue marlin, and black marlin, sharks and rays, especially blacktip sharks, silky sharks, whitetip sharks, and manta rays, and other large fish, especially unmarketable yellowfin and bigeye, mahi-mahi, and wahoo. The percentages of yellowfin and bigeye caught which were discarded remained at about the same level from 1993 through 1997. The total amounts of yellowfin discarded were greater during 1996-1997 than during 1993-1995. The total amounts of bigeye discarded increased almost steadily from 1993 through 1997. The IATTC staff is currently planning experiments, to be carried out at the Achotines Laboratory, to determine the feasibility of using a device, attached to purse seines, through which smaller fish could escape.

Dr. Hall introduced Mr. Rafael Solana, a graduate student at the Universidad Autónoma de Baja California, Ensenada, Mexico, who has been analyzing data for his Ph.D. dissertation at the IATTC headquarters in La Jolla since September 1997. Mr. Solana described his studies on the species compositions of the catches of different types of purse-seine sets made in different areas of the EPO and a stratification scheme based on several characteristics of the floating objects upon which sets are made.

Dr. Hall then spoke of work being carried out by Mr. Marco A. García, an IATTC employee who is currently working on his Ph.D. degree at the University of North Carolina. He has examined the distributions of various species of large pelagic fish in El Niño and non-El Niño years and found that the centers of distribution differ greatly during El Niño and non-El Niño years for some species, such as wahoo and whitetip shark, and virtually not at all for others, such as blue marlin. Further refinements of the statistical methodology are needed to evaluate the significance of these differences.

7. Review of the International Dolphin Conservation Program and progress on the creation of a binding international agreement for the conservation of dolphins in the eastern Pacific Ocean

The Chairman called upon Dr. Joseph to discuss this item. Dr. Joseph pointed out that the IATTC's Tuna-Dolphin Program had just been reviewed by Dr. Hall, so he would talk only about the International Dolphin Conservation Program. He stated that that program, which had been strengthened by the Agreement for the Conservation of Dolphins, adopted at the 24th Intergovernmental Meeting in June 1992, has been an outstanding success, as the annual mortalities of dolphins due to fishing decreased from about 133 thousand animals in 1986 to about 3 thousand during recent years. The mortalities of all stocks but one, northeastern spotted dolphin, have been less than the U.S. National Marine Fisheries Service's target of 0.1 percent of a minimum estimate of the population size of that stock. He indicated that the levels of abundance of all the major stocks have been stable for the last few years. He mentioned that the ecological costs of switching from fishing for tunas associated with dolphins to fishing for unassociated tunas and for tunas associated with floating objects had played an important role in the decision to strengthen the International Dolphin Conservation Program. The Agreement on the International Dolphin Conservation Program, adopted at the 35th Intergovernmental Meeting in February 1998, was signed in Washington, D.C., USA, on May 21, 1998, by representatives of Colombia, Costa Rica, Ecuador, Mexico, Nicaragua, Panama, the United States, and Venezuela. As soon as it is ratified by four states it will go into effect. He said that ratification will probably come

quickly. One of the features of the new agreement is dolphin mortality limits (DMLs) for each stock, in contrast to the present system, which specifies only one DML applying to all stocks combined.

8. Report on activities related to the working group on bycatch

The Chairman called upon Dr. Robin L. Allen, Assistant Director of the IATTC, to report on this subject. Dr. Allen pointed out that it was decided at the 58th meeting of the IATTC in June 1997 that a working group would be established to examine the question of bycatches of all species in the purse-seine fishery for tunas in the EPO, and look for ways to reduce it. The IATTC staff was instructed to prepare a document outlining the group's terms of reference and some proposals for consideration, and to distribute it among the governments. The staff would also select members of the working group. The IATTC staff is currently making preparations for the first meeting of the working group, which will take place on July 8 and 9, 1998. The representative of the United States asked for further information about the working group, for example its membership and whether observers could attend its meetings. Dr. Allen said that a list of its members would be prepared before the end of the current IATTC meeting and given to those interested in it. The membership includes a representative of a non-governmental organization. The working group's mode of operation will be discussed at its first meeting. Outsiders with expertise in subjects of interest to the working group will be called upon, as necessary, for assistance. Subgroups of the working group will be formed, when appropriate, to keep the numbers of people involved small.

9. Capacity of the purse-seine fleet in the Pacific Ocean

The Chairman asked Dr. Joseph to speak on this subject. Dr. Joseph said that, in general, the stocks of tunas in the EPO are healthy, but that there is concern that the increasing capacity of the surface fleet could result in overfishing in the near future, and therefore the staff has asked that consideration be given to limits on fishing capacity to protect yellowfin and bigeye. From 1970 to 1976 the fleet capacity increased from 100 thousand to 167 thousand metric tons. Due to severe competition for fish, most of the fleet concentrated on small fish associated with floating objects, which in turn reduced the catches and CPUEs of yellowfin during that period. The situation was alleviated when, due to poor catches in the EPO, large numbers of vessels transferred their operations to the western Pacific Ocean during the early 1980s, permitting the yellowfin stock to recover. During the last few years the capacity of the purse-seine fleet in the EPO has increased from about 100 thousand to about 130 thousand metric tons. He said that the representatives of the nations involved in the fishery might want to consider measures to limit the size of the fleet which fishes in the EPO to avoid events like those which took place during the late 1970s and early 1980s. He suggested that a working group to consider this matter be formed. One of the problems to be considered would be the effect of limitation of fleet size on the catches of skipjack, since this species is believed to be underfished in the EPO. An interim program for limitation of fleet size might be established to keep the situation under control until a permanent system was established. He said that he hoped that this matter could be given attention during the current IATTC meeting.

The Chairman pointed out that this matter would be considered again in Agenda Item 14, and then asked for comments and questions. The representative of Costa Rica asked whether the

staff had information of the numbers of vessels being built which might later be fishing in the EPO and about the extent to which the staff monitors the longline fishery. Dr. Joseph said that the staff does not maintain files on vessels being built which might later be fishing in the EPO, but that staff members had, by chance, obtained information indicating that the size of the fleet in the EPO will probably continue to increase during the next few years. He said that the staff monitors the longline fishery for tunas and billfishes in the EPO rather closely, and noted that the longline fishing effort in the EPO has dropped considerably during recent years. During the ensuing discussion the representative of Japan pointed out that the longline fishery catches only large fish, so it is not a problem with regard to overcapacity of the fleet. Dr. Joseph replied that the longline fishery is of little concern in the short term, but that it should continue to be monitored in case the situation changes. Some discussion on FAO's position on overcapacity ensued, and it was agreed that this should be taken into consideration. The Chairman said that there was agreement that fleet capacity is an important problem, and suggested that an interim working group be selected. He suggested that the working group consist of representatives of Colombia, Costa Rica, Ecuador, Japan, Mexico, Spain, the United States, and Venezuela, and the attendees agreed. After some discussion, it was also agreed that one or more staff members of the IATTC should participate in the working group, that the terms of reference of the permanent working group should be discussed by the interim working group, and that the interim working group would meet before the current IATTC meeting was resumed on the morning of June 11.

10. 50th Anniversary of the IATTC (Year 2000)

The Chairman asked Dr. Joseph to comment on this subject. Dr. Joseph suggested that representatives of Costa Rica and the United States, the two original members of the IATTC, discuss a suitable way of celebrating this anniversary, and all present agreed with this suggestion.

11. Consideration of amendments to the IATTC Convention

The Chairman called for comments on this subject. Not all the delegates agreed that it was necessary to change the IATTC's convention. Those who said that changes were necessary pointed out that: (1) two international instruments, the FAO Code of Conduct for Responsible Fisheries (CCRF), and the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of December 10, 1982, relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNIA), have established global standards for the precautionary approach to conservation, management, and exploitation of fish resources, and the IATTC convention should incorporate those concepts; (2) the present convention does not permit the adherence of regional economic integration organizations such as the European Union (EU); and (3) there is a need to redefine how shares of the budget of the IATTC are to be allocated. It was agreed that a working group should be appointed at the IATTC meeting, but that it should report to the Intergovernmental Meeting. It was pointed out that it might take a long time to formulate and adopt a new convention, whereas some considered it important that the EU adhere to the IATTC as soon as possible. It was suggested that a short protocol be added to the present convention which would permit the adherence of the EU before the new convention was formulated and adopted. After considerable discussion, the Chairman announced that the heads of delegations, led by the representative of Venezuela, would consult with one another about this matter.

The Chairman pointed out that there were two possible resolutions regarding the IATTC convention, one which would initiate the process of drafting an entire new convention and one which would consist only of a protocol which would permit the EU to adhere to the IATTC. The participants agreed on resolutions regarding amendments to the IATTC convention and on adherence of the EU to the IATTC; these resolutions are reproduced as Appendices 3 and 4 of these minutes.

12. Recommendations for a catch quota on yellowfin tuna

The Chairman called upon Dr. Joseph to speak on this subject. Dr. Joseph said that the IATTC staff was recommending a catch limit of 210,000 metric tons for yellowfin tuna in the Commission's Yellowfin Regulatory Area (CYRA) during 1998, with the option of increasing this, at the discretion of the Director, by up to three increments of 15,000 metric tons each. The Chairman called for comments on this recommendation. There were none, so he asked the Director to prepare a resolution to this effect. This resolution (Appendix 5 of these minutes) was adopted.

13. Recommendations of the bigeye working group for possible action by the Commission

The Chairman called upon Dr. Allen to talk about this matter. Dr. Allen said that at the 58th meeting of the IATTC in June 1997 a resolution was adopted which called for the establishment of a "Working Group of experts to evaluate possible management options" for protection of bigeye, "including consideration of, *inter alia*, closed areas, closed seasons, prohibitions and/or limitations on the use of certain types of fishing gear, global catch quotas, and individual vessel quotas." Meetings of the working group were held in September 1997 and January 1998. Its recommendations are listed in the Introduction of Background Paper 9. He pointed out that the tables in that document were derived from the IATTC's observer data base, rather than its statistical data base. The catch of bigeye has increased greatly during the last few years. The catches in weight were about the same in 1996 and 1997, but the catch in numbers of fish in 1997 was nearly twice that in 1996 because the fish were much smaller in 1997. The IATTC staff does not have reliable estimates of M for bigeye, so it has used three trial values, 0.4, 0.6, and 0.8. Computer simulations indicate that the combined catches by surface and longline gear with different values of M differ greatly. If M is 0.8 the combined catches would be greater if the purse-seine fleet were allowed to fish without restriction, but if it is 0.4 the combined catches would be less than they would be if the smaller fish were protected from the purse-seine fishery. The precautionary approach established in the FAO Code of Conduct for Responsible Fisheries indicates that, in the absence of a reliable estimate, the value of 0.4 should be used. The working group on bigeye recommended that: (1) limits be placed on the catches of small bigeye; (2) the use of tender vessels in the fishery on fish-aggregating devices (FADs) be prohibited; and (3) the IATTC staff undertake research on methods to minimize the catches of small bigeye. He then discussed these three points in reverse order. The IATTC staff is currently planning experiments to determine the feasibility of using a device, attached to purse seines, through which smaller fish could escape. The proposal regarding tender vessels is a difficult one, as reducing fishing efficiency is always distasteful, but this should be balanced against the possible gains realized by reducing the catches of small bigeye. Schemes for limiting the catches of bigeye by purse-seine vessels are discussed in detail in Background Paper 9. The interim working group had recommended that whatever closures were adopted should pertain to the entire EPO, rather than to

parts of it, but the IATTC staff had divided the EPO into four areas and estimated the effects of closures in various areas and combinations of areas, in addition to overall closures. Dr. Allen pointed out that the effects of the various closures listed in the tables of Background Paper 9 would be less severe than indicated in the tables because if there were a closure in, say, Areas 1 and 2 the fishermen would transfer their operations to Areas 3 and 4, where the catches would be greater than they would have been otherwise.

The representative of Mexico asked about other possible adverse effects of increased catches of small bigeye. Dr. Allen said that in 1997 the surface and longline fisheries had harvested about 9 million and 1 million fish, respectively. It is possible, although there is no indication that this is the case, that reductions in the numbers of small fish could eventually reduce the numbers of spawners so much that the recruitment would be reduced. There was some discussion about the appropriateness of using the most conservative value of M and of the possible effects of reduced spawner biomass on recruitment. It was also pointed out that the nations whose vessels fish primarily for tunas associated with floating objects would be affected much more than those whose vessels fish primarily for tunas associated with dolphins. The delegate from Spain pointed out that bigeye and yellowfin are similar in appearance, and asked if misidentification could have contributed to the high reported catches of bigeye. Dr. Joseph said that the IATTC staff members who work at locations where fish are unloaded and the observers have been trained in identification of tunas, and that their independent identifications of the same loads of fish are nearly always in agreement.

The Chairman said that there was agreement that something should be done, and the question was how that was to be accomplished. The representative from Ecuador suggested that there be a meeting of heads of delegations that afternoon to discuss the matter. It was agreed that advisors to the heads of delegations could be present at the meeting.

The Chairman announced that a draft resolution on bigeye management was being circulated, and that the floor was open for discussion on this matter. Since limitation of fleet size and protection of small bigeye are related, both subjects were included in the discussion. It was pointed out again that restriction of fishing for tunas associated with floating objects would have greater effects on the vessels of some nations than those of others. The representative of Japan favored restrictions on fishing for tunas associated with floating objects in all areas, but most of the other nations preferred such restrictions only in areas where small bigeye are most often caught. The delegate from Spain objected to the proposed ban on the use of tender vessels. There was considerable discussion concerning the amounts of small bigeye which could be caught before the fishery was restricted and whether these amounts were to include fish which were discarded at sea. Also, it was pointed out that restrictions on fishing for tunas associated with floating objects would increase the fishing effort on tunas associated with dolphins which, in turn, would increase the mortalities of dolphins.

The resolution on bigeye management, reproduced as Appendix 6 of these minutes, was approved.

14. Possible recommendations concerning the capacity of the purse-seine fleet in the eastern Pacific Ocean

The Chairman opened the floor for discussion on fleet capacity. The ensuing discussion lasted for an extended period. It included comments on regulations to protect small bigeye, as it was agreed that limitation of fleet size and protection of small bigeye are strongly related. It was agreed that vessels of coastal states which do not presently participate in the fishery should have the right to do so in the future. In particular, the representative of Colombia stated that the relative development of fishing fleets and plans for the development of economically-depressed areas should be considered. The representative from Japan stated that the greatest yields of yellowfin and bigeye could be obtained if all purse-seining effort were directed at tunas associated with dolphins. He also stated that the use of FADs should be controlled to minimize the captures of small yellowfin and bigeye. It was pointed out that restriction of fishing for tunas associated with floating objects would have greater effects on the vessels of some nations than those of others. The matter of sovereignty within the Exclusive Economic Zones (EEZs) of coastal states was also discussed. The delegate from Spain said that if there is limitation of fleet size it should include longline vessels, as well as purse seiners., since longliners catch mature fish which would be prevented from spawning. The representative of the United States pointed out that (1) interim, rather than permanent, measures were under discussion and (2) there had been a drastic reduction in longline effort in the EPO during the last few years. The delegate from Japan stated that the use of flags of convenience could cause problems in the future, and suggested that a working group on this matter be established.

The Chairman said that the Mexican delegation had prepared schedules for fleet limitation which were being distributed to the attendees. He asked for comments on these schedules and on other aspects of this subject. All delegates thanked the Mexican delegation for its carefully-prepared and thought-provoking presentation. The discussion lasted for extended period. It included comments on regulations to protect small bigeye, as it was agreed that limitation of fleet size and protection of small bigeye are strongly related. It was agreed that vessels of coastal states which do not presently participate in the fishery should have the right to do so in the future. The principal objections to the schedules prepared by Mexico were (1) the total capacity tonnages were greater than those suggested by the IATTC staff and (2) no capacity tonnages were allocated to Costa Rica, even though it was expected that at least two Costa Rican vessels would soon be participating in the fishery. The representative of Costa Rica pointed out that its tuna industry, which employs 1,500 people, was suffering because of a shortage of fish. He said that, historically, about 20 thousand metric tons of yellowfin have been caught annually in Costa Rica's Exclusive Economic Zone (EEZ), and that Costa Rica would not give up its right to harvest fish at that level in the future. He said that whatever allocation system was adopted for the long term should be based on the amounts of tuna in the EEZs of the various nations.

A draft resolution on fleet size was circulated, and the delegates made comments on specific aspects of it. Many of these comments were incorporated into the resolution, which was approved and is reproduced as Appendix 7 of these minutes.

15. Recommended research program and budget for FY 1999-2000

The Chairman called on Dr. Allen to speak on this subject. In view of the hour and the fact that Background Paper 3 had been in the hands of all member governments well before the meeting, the delegates agreed that a presentation was unnecessary. The budget proposed in the background paper was adopted.

16. Place and date of next meeting

The Chairman asked Dr. Allen for comments on this item. Dr. Allen said that if an IATTC meeting were to be held in October 1998 in association with the next meeting of the International Review Panel and the next Intergovernmental Meeting, it would take place in La Jolla. He said that for the meeting in mid-1999 the participants might wish to follow past practice, in which meetings were held in countries which had recently joined the IATTC, and that there were two nations, Ecuador and El Salvador, now in this category. The representative of Ecuador offered to host the meeting to be held in the mid-1999. Representatives of all other member countries supported this proposal. The specific location and the time of the meeting will be announced by the Director after consultation with all member nations.

17. Election of officers

The Chairman noted that the next Chairman would serve for the next year, and called for nominations. The representative of Costa Rica nominated the representative from Ecuador. This was supported by Venezuela, and all other representatives agreed. The representative from Ecuador thanked the others, but said that, due to a change in the government of Ecuador which will take place in August 1998, she would have to accept on behalf of a person to be named later.

18. Other business

The representative of Taiwan made a statement thanking the Commission for inviting Taiwan to attend as an observer. He said that, to cooperate more fully, Taiwan wished to join the IATTC, and asked the parties to the convention to consider the possibility of Taiwan's membership.

The observer from the Commission for the Conservation of Southern Bluefin Tuna provided a written statement, which is attached as Appendix 8 of these minutes.

The representative of FAO thanked the Commission for the opportunity to participate in the meeting as an observer. He was grateful for the collaboration and cooperation of the IATTC with the work of FAO, and in particular referred to the forthcoming expert consultation on Implications of the Precautionary Approach: Tuna Biological and Technological Research and the global atlas of tuna and billfish catches which had recently been published. He informed the meeting that the Indian Ocean Tuna Commission is fully operational, with the secretariat established and the headquarters located in the Seychelles.

19. Adjournment

The Chairman thanked the delegates, IATTC staff members, and interpreters for their hard work, and adjourned the meeting on June 13 at 12:25 a.m.