MINUTES OF THE 55TH MEETING OF THE
INTER-AMERICAN TROPICAL TUNA COMMISSION

La Jolla, California, USA
June 13-15, 1995

Agenda Item 1 - Opening of the meeting

The 55th meeting of the Inter-American Tropical Tuna Commission (IATTC) was called to order by the Chairman, Mr. Brian Hallman of the United States, on June 13, 1995 at 10:20 a.m. Representatives of all the member governments of the IATTC except Nicaragua and Vanuatu were in attendance, as were representatives of Colombia, Ecuador, Mexico, the Seychelles, Spain, Taiwan, the International Commission for the Conservation of Atlantic Tunas, the International Whaling Commission, the Organización Latinoamericana de Desarrollo Pesquero (OLDEPESCA), the Asociación Empresarial Pesquera de América Latina (ALEP), the Center for Marine Conservation, the Earth Island Institute, the Fishermen's Coalition, the Fundación para la Defensa de la Naturaleza (FUDENA), Greenpeace International, the Humane Society International, the Red Mexicana de Acción frente al Libre Comercio, the Whale and Dolphin Conservation Society, and the World Wildlife Fund. These are listed in Appendix 1 of these minutes.

Agenda Item 2 - Adoption of agenda

The Chairman called for suggestions for modifications to the agenda (Appendix 2). There were none, so it was adopted without change.

Agenda Item 3 - Review of current tuna research

The Chairman called upon Dr. James Joseph, Director of the IATTC, to introduce this subject. Dr. Joseph said that the results of the staff's research are published in its Annual Reports and Bulletins and in outside scientific journals. He stated that the IATTC meetings are held from time to time in La Jolla to give the Commissioners and other attendees a chance to meet members of the IATTC staff and get a better understanding of the work that they are doing.

Dr. Joseph then called upon Dr. Richard B. Deriso, head of the IATTC's Tuna-Billfish Program. Dr. Deriso described the staff's current studies on the recruitment of yellowfin tuna in the eastern Pacific Ocean (EPO). Estimates of recruitment, abundance of spawners, sex ratio, fecundity, and spawning frequency are combined to estimate the survival rate from spawning to recruitment. The survival seems to be positively correlated with the area of the EPO in which the sea-surface temperatures are greater than 26°C (79°F). He described the IATTC's studies at its laboratory in Achotines, Panama. Most of the work to date has been conducted with black skipjack tuna, but an agreement has recently been reached by the Overseas Fishery Cooperation Foundation (OFCF) of Japan, the government of the Republic of Panama, and the IATTC to undertake a joint 5-year project, funded mostly by the OFCF, at the Achotines Laboratory. The facilities at the laboratory are currently being expanded, and it is anticipated that more work on yellowfin can be carried out when construction is completed. He also mentioned studies on the early life histories of yellowfin and bluefin carried out by staff members of the Japan Sea Farming Association (JASFA) and the IATTC at JASFA's Yaeyama Station on Ishigaki Island, Okinawa Prefecture.

Dr. Deriso then called upon Mr. Kurt M. Schaefer to describe his studies of the reproductive biology of yellowfin and skipjack tuna in the EPO. Mr. Schaefer showed that larvae of yellowfin occur in waters of the EPO with surface temperatures greater than 26°C throughout the year. About 50 percent of yellowfin females 100 cm long (equivalent to about 45 pounds or 20 kg) are sexually mature. Mature females spawn at intervals of about 1.43 days. A 100-cm fish spawns about 1 million eggs at each spawning, and a 150-cm fish (equivalent to about 150 pounds or 70 kg) produces about 5 million eggs at each spawning. The skipjack caught in the EPO are generally believed to be mostly the result of spawning in the central Pacific Ocean. Re-examination of all available data shows that skipjack larvae have rarely been caught east of 100°W, but that they occur far more frequently in the EPO west of 100°W. Skipjack gonads are currently being collected by observers so that more can be determined about the spawning of skipjack in the EPO.

Dr. Deriso then introduced Mr. Michael G. Hinton, who talked about his studies of billfish ecology. Mr. Hinton said that his research is being carried out in collaboration with scientists from the National Research Institute of Far Seas Fisheries (NRIFSF) in Shimizu, Japan, and the U.S. National Marine Fisheries Service (NMFS) in Miami, Florida. Currents, upwelling, eddies, and frontal zones are all known to influence the distribution of billfishes. Also, the distributions of spawning and non-spawning billfishes may differ. It is not possible, in most cases, to obtain unbiased estimates of the distributions of billfishes from unadjusted data on catches by longliners because the effort is directed at other species, particularly bigeye tuna. With appropriate adjustments, however, much better estimates can be obtained. He showed slides with unadjusted and adjusted distributions of blue marlin and swordfish; for both species the unadjusted and adjusted distributions were considerably different. The adjusted data indicate considerable seasonal movement of the fish. Dr. Deriso noted that there is a need for better catch and effort data for billfishes, and stated that Mr. Hinton will serve as chairman for a meeting on that subject which will take place in July 1995.

Dr. Deriso then called upon Mr. Alejandro A. Anganuzzi to describe his work on tuna fleet dynamics. A better understanding of how the captains of fishing vessels make decisions will lead to better evaluation of logbook data. The fundamental questions are: (1) what information is available? and (2) how do the captains respond to that information? Not all captains respond in the same way to the same information; for example, some of them fish primarily for dolphin-associated fish while others fish primarily for fish in free-swimming schools and/or fish associated with floating objects. The situation is complicated by the fact that most of the vessels belong to code groups of about 5 to 10 boats which exchange information on fishing success with one another, but not with other vessels. Dr. Deriso said that Mr. Anganuzzi's work will also be useful in evaluation of the interactions of among various fishing fleets, a subject which has gotten considerable attention during recent years.

Dr. Deriso then asked if there were any questions on the information that had been presented. Mr. Felipe Charat of ALEP remarked that fecundity was shown on a slide as a function of length, but that people in the fishing industry are more interested in the weights of the fish. Dr. Deriso replied that equations for converting lengths to weights have been calculated. He said that the relationship of fecundity to weight is linear, whereas that of fecundity to length is curvilinear.

Agenda Item 4 - The 1994 fishing year

After a break for lunch, the Chairman called upon Dr. Joseph to describe the fishery in 1994. Dr. Joseph showed some slides of catch and effort for 1993, 1994, and the first five months of 1995. The total catches of yellowfin and skipjack and the effort were roughly the same in 1993 and 1994, and it appears that the catches and effort in 1995 will be roughly equal to those of 1993 and 1994. He also showed slides with information on the catches and fleet size by flag and the areal distributions of the catches of yellowfin, skipjack, and bigeye tuna.

Agenda Item 5 - Status of tuna stocks

The Chairman called upon Dr. Joseph to discuss the status of the tuna stocks of the EPO. Dr. Joseph began his discussion with yellowfin. The IATTC staff first recommended regulations for yellowfin in the early 1960s, and regulations were implemented from 1966 through 1979. After that it was no longer possible to get the nations which participated in the fishery to agree on allocation of the quotas among nations. Three methods, based on catch per day of fishing, catch per hour of searching for fish, and cohort analysis, are used to estimate the relative abundance of yellowfin in the EPO; all three give similar results. During the mid- to late 1970s and early 1980s large portions of the fishing effort were directed at smaller yellowfin, which resulted in lower catches per unit of effort (CPUEs) during late 1970s and early 1980s. During 1982 and 1983 there was a strong El Niño event, which made the fish more difficult to catch. At this time many vessels transferred their operations to the western Pacific Ocean. The decrease in fishing effort proved beneficial to the condition of the stock, and the CPUEs increased during the mid-1980s. Since then the effort has been less than it was from the mid-1970s to the early 1980s, and the CPUEs have remained high. Dr. Joseph described production models and two types of age-structured models which are used to assess the condition of yellowfin in the EPO. Production models require only catch and effort data collected over a series of years during which there was considerable variation in the amount of effort exerted. Age-structured models require information on the catches of fish of the various ages and on the growth and mortality of the fish. The results obtained with these two approaches are compatible with one another. They indicate that yellowfin is slightly underfished in the EPO. If the recruitment in 1995 is about equal to the average recruitment of 1985-1994, a quota of about 260 thousand tons would be appropriate. If it is about equal to the average of 1992-1994, a quota of 240 thousand tons would be appropriate. Unfortunately, it is too early to estimate the recruitment for 1995.

Dr. Alain Fonteneau of France asked why the recruitment was apparently greater during 1976-1984 than during 1967-1975, and Dr. Joseph said that this was due largely to the fact that the area of the fishery had expanded. Dr. Fonteneau said that the data on fleet size are misleading because improvements in the vessels and gear are increasing their efficiency. He suggested that a table comparing fleet size and total fishing power of the fleet would be useful. Dr. Joseph replied that the IATTC staff does not use fleet size as an index of fishing effort in its stock assessments. For this purpose it uses indices derived mostly from logbook data. He said that calculation of factors to adjust for changes in vessel efficiency is extremely difficult. However, these changes are taken into account, particularly in the searching-time method for calculating CPUE. Mr. Charat asked if the increased time that was

being spent in removing dolphins from the net was making the vessels less efficient. Dr. Joseph replied that this time is not counted as fishing time in the searching-time method. Mr. Minoru Morimoto of Japan asked about the size composition of yellowfin in the catches, the schooling habits of yellowfin and skipjack, and the use of fish-aggregating devices (FADs) in the EPO. Dr. Joseph replied that tunas are caught in three types of schools, fish associated with dolphins, fish in free-swimming schools, and fish associated with floating objects. The yellowfin in dolphin-associated schools are larger than those in the other two types of schools. Skipjack are not often found in dolphin-associated schools, but yellowfin are frequently caught with skipjack in free-swimming and log-associated schools. FADs are used much less frequently in the EPO than in the western Pacific and Atlantic Oceans. Dr. Guillermo Compeán of Mexico asked about the effects of the capture of small fish on the recruitment of yellowfin. Dr. Joseph replied that approximately 3.5 to 7 million unmarketable yellowfin are caught each year in sets made on fish in free-swimming schools and fish associated with floating objects. Since the annual recruitment is about 70 to 90 million fish, about 3 to 5 percent of the recruitment is lost in this way. If fishing effort on dolphin-associated schools of yellowfin were shifted to schools associated with floating objects the discards would increase to about 13 to 25 million fish--a significant fraction of the total recruitment. He pointed out that he had previously said that such a shift would (1) reduce the yield per recruit of yellowfin by about 25 to 30 percent and (2) reduce the portion of the recruitment available to the fishery due to reduction of the area in which it takes place. Dr. Fonteneau and Dr. Compeán asked whether yellowfin which are discarded at sea are counted as catch for purposes of stock assessment. Dr. Joseph said that they are not, but that until recently the percentages have been fairly constant, so this would not make much difference in the estimates. Extensive information on discards is available only for the last few years; when more data are available, that information may be incorporated into the calculations. If the portion of the catch which is taken by vessels fishing for log-associated fish increases the amount of discards will increase. He also noted that if the mode of fishing is changed the effective recruitment will decrease because the fishery for log-associated fish takes place in a smaller portion of the EPO than does the fishery for dolphin-associated fish.

Dr. Joseph said that, on a world-wide or Pacific-wide basis, the catches of skipjack tuna are considerably greater than those of any other species of tuna. In the EPO, however, the catches of yellowfin exceed those of skipjack. The greatest catches of skipjack in the EPO are made off Central America and northern South America. The status of skipjack in the EPO cannot be determined with production models because they mingle with the skipjack of the central and western Pacific Ocean. Yield-per-recruit analyses indicate that it would be impossible, or nearly so, to overfish skipjack from a yield-per-recruit standpoint in this area.

On a world-wide and Pacific-wide basis, the tonnage of bigeye tuna caught ranks third, after skipjack and yellowfin. Whereas the catches of skipjack and yellowfin are greater in the western Pacific than in the EPO, the opposite is the case for bigeye. A large portion of the bigeye catch is used for high-priced *sashimi*, so its economic value is greater, per unit of weight, than those of skipjack or yellowfin. Bigeye are caught mostly by longlines. In the EPO bigeye are most abundant west of Baja California between 120°W and 140°W and off northern South America between the coast and 140°W. They occur at greater depths than do most other tunas and billfishes. During the mid-1970s most of the Japanese longliners modified their gear so that it fished

deeper (50 to 250 m (27 to 137 fathoms), as compared to 50 to 120 m (27 to 66 fathoms) for regular longline gear), thereby increasing their catches of bigeye and decreasing their catches of most other species. The catches of bigeye by surface gear in the EPO have been much less than those of yellowfin and skipjack. In 1994, however, it was discovered that bigeye associated with floating objects, but well below the surface, can be detected with sonar and caught with purse seines, and more than 31 thousand tons were caught during that year. The bigeye caught by surface gear in 1994 were considerably smaller, on an average, than those caught by surface gear during most prior years, and those caught by surface gear during most prior years were considerably smaller than those caught by longlining.

The CPUEs of bigeye remained at about the same level from 1964 through 1987, while the effort more than doubled. Ordinarily the CPUE decreases when the effort increases; perhaps the CPUE remained at the same level because the gear was modified so that it fished more in the depths that bigeye inhabit. Staff members of the NRIFSF and the IATTC have recently made some improvements to the methods for estimating relative abundance of bigeye (and yellowfin) from longline CPUE data. Yield-per-recruit analyses indicate that the greatest yields per recruit can be achieved when the size at entry is between about 60 and 120 cm (12 and 90 pounds or 5 and 40 kg). The IATTC staff performed cohort analyses for bigeye to estimate its recruitment in the EPO, and then used these estimates to estimate the effects of purse-seine catches of 30 thousand tons per year on the longline fishery. These analyses were based on the assumption that the surface and longline fisheries exploit the same stock or stocks of bigeye. It was estimated that the longline catches would be reduced from about 64 thousand tons per year to less than 1 thousand tons per year if the coefficient of natural mortality (M) is 0.4, from about 64 to 32 thousand tons per year if M is 0.6, and from about 64 to 48 thousand tons per year if M is 0.8. Dr. Joseph emphasized that these estimates are extremely crude and may be severely biased, due to lack of data on bigeye. However, they provide a reference point for monitoring changes in the fishery.

Dr. Fonteneau said that the catch of bigeye by surface gear in the Atlantic Ocean, where the ratios of surface to longline catches have been greater than in the Pacific Ocean for many years, increased greatly in 1993. He said that the coefficient of natural mortality of bigeye in the Atlantic Ocean during its first two years in the fishery was estimated to be 0.8 and that this is believed to decrease to 0.4 for older fish. If such is the case for the Pacific Ocean, the effect of the surface fishery on the longline fishery would be less than estimated by the IATTC staff. Mr. Morimoto thanked Dr. Joseph for his discussion of the bigeye situation, and said that his government is greatly concerned about the increased catch of small bigeye in the EPO by the surface fishery. He said that it is important for the IATTC staff examine the impact of large purse-seine catches of small bigeye on the abundance of bigeye and on the catches of bigeye by the longline fishery, and Dr. Joseph agreed with him.

Finally, Dr. Joseph discussed swordfish. After increased catches of swordfish in the Atlantic Ocean in recent years, the resource appears to be overfished, and some vessels have shifted their operations to the Pacific Ocean. Swordfish do not appear to be overfished in the Pacific, but it is prudent to monitor the fisheries for swordfish carefully. The greatest catches of swordfish in the Pacific Ocean are made by vessels of Japan, the United States, Chile, and the Philippines, in that order. In the EPO the

greatest catches are made by vessels of the United States, Chile, Japan, and Mexico, in that order.

The representative from Mexico asked if estimates of the abundance of swordfish are available. Dr. Joseph said that only estimates of relative abundance have been calculated, and that these are based mostly on data for the Japanese longline fishery. Mr. Morimoto mentioned the need to improve the swordfish statistics and to determine the stock structure of swordfish. He also said that the IATTC should cooperate with the South Pacific Commission and the newly-organized Interim Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean in pursuit of more knowledge of swordfish, since there is thought to be only one stock of swordfish in the Pacific Ocean. The representative from Ecuador offered to make Ecuador's data base on swordfish available to the IATTC staff. Dr. Joseph thanked him for this kind offer, and said that IATTC staff members would be contacting their counterparts in Ecuador in this regard.

The meeting was adjourned for the day at 5:30 p.m.

Agenda Item 6 - Review of tuna-dolphin research and extension programs

The meeting was reconvened by the Chairman on June 14, 1995, at 9:30 a.m. He turned the floor over to Dr. Joseph, who introduced Dr. Martín A. Hall, head of the IATTC's Tuna-Dolphin Program. Dr. Hall said that the Tuna-Dolphin program includes gear studies, estimation of mortality and relative abundance of dolphins, other biological studies, and estimation of the incidental catches associated with purse-seining for tuna. Most of the data come from the observer programs, which cover all trips by vessels with carrying capacities greater than 400 short tons.

Dr. Hall then introduced Mr. David A. Bratten and Ms. Cleridy E. Lennert to discuss mortalities of dolphins due to the fishery. They listed the various factors which affect the mortalities. The natural factors include the species or stock of dolphins, the area, the size of the herd, the amount of tunas caught, the condition of the ocean, the weather, and the time of day. The factors under the captain's control include avoidance of high-risk situations, backing down, hand rescue of dolphins, use of floodlights during hours of darkness, maintenance of dolphin-safety equipment, crew selection and training, and crew motivation. The factors under the vessel owner's or manager's control include vessel maintenance, procurement of dolphin-safety equipment, procurement of a helicopter, selection and motivation of a captain, and crew selection. The factors which are correlated with higher mortalities of dolphins are, in approximate order of importance: (1) formation of canopies in the net, herd size, and amount of tunas caught; (2) duration of set, collapse of net, and species of dolphins encircled; (3) currents, area, and gear malfunctions. IATTC staff members inspect the dolphin-safety gear of the vessels and observe trial sets to determine if the dolphin-safety panels are correctly placed. Mr. Bratten described the Medina cloth panel which has been used, with some success, on two vessels and the Freitas panel, which has not been used but which is believed to offer considerable promise. He also described an acoustic Doppler current profiler which can be used to detect subsurface currents.

Dr. Hall then introduced Mr. Felipe Galván-Magaña of the Centro Interdisciplinario de Ciencias Marinas of La Paz, Mexico, who has been working with an IATTC staff member on the food and feeding habits of dolphins, tunas,

and other upper-level predators. Mr. Galván said that the objectives of the study are (1) to determine the trophic relationships of the various upper-level predators and (2) to determine the extent to which their diets overlap. Stomach contents were taken from fish and dolphins caught in 133 dolphin-associated sets, 106 sets on free-swimming schools of tuna, and 94 sets on schools of tuna associated with floating objects. Also, tissue samples were taken to determine the $^{13}C/^{12}C$ and $^{15}N/^{14}N$ ratios. A total of about 8,300 stomach and tissue samples have been taken. The analyses of the data include the amounts of the various prey categories consumed, fullness of the stomachs, times of day of feeding, and state of digestion of the food. During the daylight hours, the tunas had fresh food in their stomachs in both the morning and afternoon, whereas the dolphins rarely had fresh food in their stomachs except during the early morning. During the daytime, spinner dolphins had fed mostly on mesopelagic prey, whereas spotted dolphins and yellowfin tuna had fed mostly on epipelagic organisms. However, there were greater proportions of the hard parts of mesopelagic organisms in the stomachs of spotted and spinner dolphins than in those of the yellowfin. This could indicate that the dolphins feed at greater depths than the yellowfin and/or that they feed more at night that the yellowfin.

Dr. Hall then called upon Dr. Robert J. Olson to talk about tracking studies carried out on yellowfin tuna and spotted dolphins. Dr. Olson said that the funds for this project came from a special allocation from the U.S. Congress. The work was carried out aboard the U.S.-flag purse seiner *Nicole K.* in 1992 and the Mexican-flag purse seiner *Convemar* in 1993, and the U.S. National Oceanic and Atmospheric Administration research vessel *McArthur* in both years. The tunas and dolphins were tagged in the net by swimmers, and then released. Acoustic transmitters were used on the tunas, and radio transmitters and time-depth recorders (TDRs) were used on the dolphins. The tunas were tracked for up to 2 days and the dolphins for up to 4 days. Five of the seven TDRs attached to dolphins were later recovered, and the information on times and depths was transferred to a computer for analysis. At most times during the days the fish were at greater depths than the dolphins, but the dolphins often dove much deeper at night, presumably to feed on vertically-migrating mesopelagic organisms. Three explanations for the association between tunas and dolphins have been proposed: (1) the association is food based; (2) the association affords protection from predation; (3) the dolphins provide a rallying point for the tuna. The most recent data, which show that tunas feed all day, whereas dolphins feed primarily at night and perhaps early in the morning, do not offer much support for the first hypothesis.

Dr. Hall then called upon Mr. Anganuzzi to describe the latest studies on the relative abundance of dolphins. Mr. Anganuzzi said that the data used for these estimates are obtained from the observer programs. The data must be stratified because sampling is not uniformly distributed over the ranges of the various species and stocks of dolphins. This has been accomplished by what is called the post-stratification method because the strata are selected after the data are collected. Recent work by U.S. NMFS scientists shows strong correlations between certain oceanographic variables and the distributions of dolphins. Those correlations can be exploited to model the density of each species or stock as a continuous surface throughout the appropriate area. Such models provide an alternative means for extrapolating to the stock boundaries in areas of low searching effort. The IATTC staff is using generalized linear models to relate oceanographic and locational covariates to the observed encounter rates and herd sizes obtained from the

tuna vessel observer data for each year. He showed a slide comparing the trends estimated for the pooled stocks of spotted dolphin by the two methods. Work is currently underway to improve the procedures and to extend the estimation to the other stocks.

Agenda Item 7 - Review of International Dolphin Conservation Program

The Chairman called upon Dr. Joseph to initiate this topic. Dr. Joseph briefly reviewed the history of the International Dolphin Conservation Program (IDCP). During the 1960s and early 1970s nearly all the purse-seine vessels which fished for tunas were registered in the United States, so the mortality of dolphins due to fishing was perceived to be a U.S. problem. Later, when the vessels of other countries entered the fishery in increasing numbers, it became clear that the problem could not be solved by the United States alone. In 1975 it was agreed that the IATTC should become involved in dolphin studies, but it did not receive funds for this purpose until 1980, and the program was not fully funded until 1986. In 1986 the mortality of dolphins was about 133 thousand animals, and by 1992 this number had fallen to about 15 thousand animals. The Agreement for the Conservation of Dolphins, establishing the IDCP, was adopted in 1992. Among other things, it set annual limits on the overall mortalities of dolphins for 1993 through 1999 and established the International Review Panel (IRP) which would review, on a case-by-case basis, reports of violations of laws and regulations for fishing for tunas associated with dolphins. The overall dolphin mortality limits (DMLs) are divided equally among the vessels which announce their intention to fish for tunas associated with dolphins, and any vessel which exceeds its DML must cease fishing for tunas associated with dolphins for the rest of the year. Also, its DMLs for succeeding years can be reduced by the amount that it exceeded its DML in the first year. This provides incentives for the captains of the vessels to minimize the mortalities of dolphins due to fishing.

Dr. Joseph then called upon Dr. Hall, who said that he would discuss the causes of mortality and the ways to minimize it. He said that the mortality in 1994 was 4,095 animals, 542 of which occurred in one "disaster" set. In 1993 and 1994 the mortalities per set were 0.52 and 0.53 animals, respectively. Without the disaster set, the mortality per set in 1994 would have been 0.46 animals. The components of mortality are the number of sets and the mortality per set. The number of sets can be controlled by regulatory bans, regulatory limits, trade sanctions, or boycotts. The mortality per set can be controlled by regulations, technical advances, training and motivation of the fishermen, and marketing. He showed a slide listing the estimated mortalities, and the confidence intervals for those estimates, for each stock of spotted, spinner, and common dolphin for 1994. The mortalities for all of the stocks were well below the estimated reproduction rates.

Dr. Joseph said that the IDCP is working well, as the mortalities of dolphins have decreased, the populations of dolphins are stable or increasing, and the tuna stocks are in good condition. However, if there is a shift from fishing for tunas in schools associated with dolphins to fishing for tunas in free-swimming schools and/or schools associated with floating objects the yield per recruit and effective recruitment of yellowfin will decrease. Also, the incidental catches of small, unmarketable tunas and billfishes, sharks, turtles, *etc.* will increase. More research on ways to catch large tunas without harming dolphins would be highly desirable.

Dr. Hall reviewed, in general, the effects of fishing. Fishing can affect the environment in ways other than removing fish and other animals, *e.g.* disturbing the bottom. Animals which are caught may be killed or released alive. Of those which are killed, some may be retained for consumption and others may be discarded. Of those that are retained, some may be accepted and others rejected by the buyers. Of those that are accepted, parts (heads, entrails, *etc.*) are discarded or converted to low-priced commodities, such as fish meal. He then reviewed data on the incidental catches of various fisheries. The ratio of weight of animals killed and discarded to weight of animals landed is lower for yellowfin associated with dolphins than for the fisheries for tunas in free-swimming schools, tunas in schools associated with floating objects, and most other fisheries. The Potential Biological Removal (PBR) concept has been incorporated into the U.S. Marine Mammal Protection Act (MMPA) to set conservative limits on the fishery-caused mortalities of marine mammals in U.S. waters. The PBR is defined in Section 12(20) of the 1994 reauthorization of the MMPA as "the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. The potential biological removal level is the product of the following factors: (A) the minimum population estimate of the stock; (B) one-half the maximum theoretical or estimated net productivity rate of the stock at a small population size; (C) a recovery factor of between 0.1 and 1.0." If a fishery caused mortalities in excess of the PBR a "Take Reduction Team" would be formed to seek ways to reduce the mortality to less than the PBR. In the long term, fisheries are expected to achieve a "Zero Mortality Rate Goal" (ZMRG), which has been provisionally defined as one-tenth of the PBR. This concept would not apply to the fishery for tunas associated with dolphins, as this does not take place in U.S. waters. Nevertheless, Dr. Hall showed a slide which compared the 1994 mortalities, PBRs, and ZMRGs for each stock of dolphins. The mortalities were less than the PBRs for all stocks, but slightly above the ZMRGs for both stocks of spotted dolphins and for eastern spinner dolphins.

Dr. Hall then introduced Mr. Marco A. García, who talked about the data collected on incidental catches by the purse-seine fishery for tunas. The coverages for 1993 and 1994 were 56 percent for sets made on fish associated with dolphins, 62 percent for sets made on free-swimming schools, and 64 percent for sets made on schools associated with floating objects. The principal animals caught incidentally are "small fishes," "large fishes," sharks, and dolphins. More dolphins are caught in sets made on tunas associated with dolphins, but far more of the other types of animals are caught in sets made on free-swimming schools of tunas and sets made of tunas associated with floating objects. The catches of unmarketable yellowfin and skipjack, mahi-mahi, and wahoo per set are least for sets on dolphin-associated fish and greatest for sets on fish associated with floating objects.

Dr. Hall said that the basic questions include: (1) when is bycatch reduction needed? (2) is selectivity always desirable? (3) what should be the goals of bycatch reduction programs? (4) when is utilization a better solution? Many questions concerning bycatches will be discussed at a workshop which will be held in Seattle, Washington, USA, on September 25-27, 1995.

Dr. Michael Tillman of the United States briefly discussed the concept of "potential biological removal," and said that it was formulated for U.S. fisheries for which relatively few data on stock sizes, natural mortality

rates, and reproductive rates are available. He said that since good data for the stocks of dolphins involved in the tuna fishery are available, the IATTC estimates are quite good. Dr. Fonteneau pointed out the possibility that some of the discarded fish which were recorded as yellowfin could be bigeye, and Dr. Joseph replied that the IATTC staff was directing its attention to this possibility. Dr. Tillman said that it was encouraging that the mortality of dolphins had been under 5,000 in 1994, and asked if any preliminary data for 1995 were available. Dr. Hall said that the number of sets on dolphin-associated fish was up 25 percent, the catch in such sets was up 37 percent, and the mortality in such sets was up 2 percent. If there are no disaster sets in 1995, the mortality should be about same as in 1994. Mr. Morimoto said that the mortalities of dolphins due to fishing are approaching the zero level, and thus are biologically insignificant. Attempts to reduce or eliminate incidental mortalities of dolphins have created serious bycatch problems, however. He said that the IATTC should strive to relax the restrictions on dolphin mortality, but not to the extent that the abundance of any of the stocks of dolphins would be reduced. The representatives of several nations praised the IDCP and expressed concern about the effects of switching away from fishing for dolphin-associated fish.

The meeting was adjourned by the Chairman at 1:35 p.m.

Agenda Item 8 - Recommendations for 1995

After a break for the first part of the Intergovernmental Meeting, the Chairman reconvened the IATTC meeting on June 15, 1995, at 10:30 a.m., and turned the floor over to Dr. Joseph.

Dr. Joseph said that the IATTC staff was recommending a quota of 235,000 short tons for yellowfin in the Commission's Yellowfin Regulatory Area, with a provision for increasing it by up to 60,000 tons at the discretion of the Director. He said that the uncertainty was due to the fact that it is not possible to estimate the recruitment for 1995, and emphasized that if the recruitment is low this would not be the result of overfishing. The draft resolution was adopted (Appendix 3).

Agenda Item 9 - Recommended research program and budget for FY 1996-1997

The Chairman called upon Dr. Joseph to discuss this item. Dr. Joseph said that the budget for FY 1995-1996 was $4,866,767, and that he was recommending that this be increased by 2.7 percent to $4,998,170 for FY 1996-1997 to compensate for inflation. He said that the funds received are less than the budget because the Congress of the United States, which has been the principal contributor to the IATTC budget, does not approve the entire amounts requested. During the late 1980s it was cutting the proposed IATTC budgets by about 20 percent, but during the mid-1990s it has been cutting the proposed budgets by about 34 percent. The normal budgets are not the only source of funds, however. For example, the IATTC gets money from the vessel owners to help cover observer costs, and it also gets funds from various organizations for various purposes. The latter vary considerably from year to year.

Dr. Tillman said that he wished to follow up Mr. Morimoto's comments of the previous day regarding bigeye and swordfish. He said that it was clear that research on bigeye should receive adequate attention. He also stated that there are potential problems resulting from the fact that there are a number of organizations which are working on swordfish or intending to do so.

Such being the case, he said that he was pleased that the IATTC staff was seeking opportunities to collaborate with other organizations in such research.

Agenda Item 10 - Place and date of next meeting

The Chairman called for comments on a venue for the next meeting of the IATTC. The representative from Costa Rica offered Costa Rica as the site for the meeting of the IATTC which will take place in June 1996. The representatives of all the other nations agreed, so this generous offer was accepted. Mr. Morimoto asked whether there would be a meeting of the IATTC similar to the one which was held in October 1994. Dr. Joseph said that such a meeting would be desirable, and the representative of Panama generously offered his country as a site for that meeting. Everyone in attendance agreed with that choice. The Chairman said that Dr. Joseph would canvass the various attendees to find dates that were acceptable to everyone and then notify all concerned of those dates.

Agenda Item 11 - Election of officers

The Chairman said that the host country normally provides the Chairman for the meeting, and asked if there were any objections to continuing that policy. There were none, so Panama and Costa Rica will provide the Chairmen for the October 1995 and June 1996 meetings, respectively.

Agenda Item 12 - Other business

The Chairman asked if anyone had any other business to bring up. Dr. Joseph said that vessels sometimes change flags, but when they are registered with a new nation they do not always drop their registration with the old nation. According to the United Nations Law of the Sea Convention, a vessel which is registered with more than one nation is not registered with any nation. Regardless of the technicalities, this creates problems with infractions, sanctions, and assessments for observer costs. He urged the nations involved to communicate with one another in this regard. Lic. Camacho of Mexico said that this should not be a major problem.

Agenda Item 13 - Adjournment

There being no more business, the Chairman adjourned the meeting at 10:55 a.m.

APPENDIX 1 -- ANEXO 1

INTER-AMERICAN TROPICAL TUNA COMMISSION
COMISION INTERAMERICANA DEL ATUN TROPICAL

55th MEETING -- 55ª REUNION
La Jolla, California
June 13-15, 1995 -- 13-15 de junio de 1995

ATTENDEES -- ASISTENTES

MEMBER COUNTRIES -- PAISES MIEMBROS

COSTA RICA

ALVARO MORENO GÓMEZ
Comisionado

JAIME BASADRE OREAMUNO
Comisionado

JAIME BASADRE
Comisionado

HERBERT NANNE ECHANDI
Colegio de Biólogos
de Costa Rica

FRANCE

ALAIN FONTENEAU
ORSTOM

JAPAN

MINORU MORIMOTO
Commissioner

KIYOSHI KATSUYAMA
Marine Resources Division
Research Department
Fisheries Agency of Japan

TAKAAKI SAKAMOTO
International Affairs Division
Oceanic Fisheries Department
Fisheries Agency of Japan

YUICHIRO HARADA
Federation of Japan Tuna Fisheries Cooperative
Association

SALLY J. CAMPEN
Federation of Japan Tuna Fisheries Cooperative
Associations

PANAMA

RICARDO MARTÁNS G.
Comisionado
Ministerio de Comercio e Industrias

UNITED STATES

BARBARA BRITTEN
Commissioner

M. AUSTIN FORMAN
Commissioner

JAMES T. McCARTHY
Commissioner

MICHAEL TILLMAN
Commissioner

UNITED STATES (CONTINUED -- CONTINUACIÓN)

HILDA DIAZ-SOLTERO
ROBERT BROWNELL
AL COAN
NORM BARTOO
PAUL NIEMEIER
CHUCK OLIVER
DANA WILKES
National Marine Fisheries Service

BRIAN HALLMAN
Department of State

MARTIN HOCHMAN
TED BEUTTLER
National Oceanic and Atmospheric Administration

DAVID BURNEY
U.S. Tuna Foundation

PETE DiLEVA
Caribbean Fishing, Inc.

MICHAEL DUNN
Mitsubishi Foods (MC) Inc.

TED DUNN
Lopreste-Dunn Sportfishing

AUGUST FELANDO
Consultant

PETER H. FLUORNOY
International Law Offices

WILLIAM GILLIS
American Tuna Sales Association

PAUL KRAMPE
Van Camp Seafood Company

MARK McAULIFFE

MICHAEL McGOWAN
Cabason, Inc.

OTTO OBRIST
Ocean Ventures, Inc.

GEORGE SOUSA
GS Fisheries

CHARLES PECKHAM
LMR Fisheries Research

MARK ROBERTSON
JESSICA BERK
Gold & Liebengood

DOUGLAS SATO
White Fuji, Inc.

ED STOCKWELL
Star-Kist Foods, Inc.

ED VAN OS
Van Os Oceanic International, Inc.

ED WEISMAN

VENEZUELA

MIRIAM R. de DE VENANZI
Instituto de Comercio Exterior

HUGO ALSINA LAGOS
SARPA, Ministerio de Agricultura y Cría

NON-MEMBER COUNTRIES -- PAISES NO MIEMBROS

COLOMBIA

SILVIA FORERO DE GUERRERO
Ministerio de Agricultura

CLARA GAVIRIA
Ministerio de Comercio Exterior

ALEJANDRO LONDOÑO GARCÍA
Instituto Nacional de Pesca y Acuicultura

ARMANDO HERNÁNDEZ RODRÍGUEZ
Cámara de la Industria Pesquera

ALVARO BUSTAMANTE STEER
AMERICO RODRIGUEZ CHRISTENSEN
Atunes y Enlatados del Caribe, S.A.

ECUADOR

GUSTAVO GONZALEZ CABAL
LUIS TORRES NAVARRETE
Ministerio de Industrias, Comercio, Integración y Pesca

MÉXICO

CARLOS CAMACHO GAOS
ANTONIO DÍAZ DE LEÓN
PABLO ARENAS FUENTES
RICARDO BELMONTES ACOSTA
GUILLERMO COMPEÁN JIMÉNEZ
Secretaría de Medio Ambiente, Recursos Naturales y Pesca

SERGIO GÓMEZ LORA
Secretaría de Comercio y Finanzas

A. AVILÉS ROCHA
MANUEL CHABLÉ GUTIÉRREZ
JORGE ANTONIO CATALÁN SOSA
JOSÉ LUIS LEYSON CASTRO
SERGIO MEZA LÓPEZ
Cámara de Diputados
Comisión de Pesca

RICARDO RAMÍREZ LEAL
Consulado General de México

GUILLERMO GOMEZ
Consultant
Gomez-Hall Associates

FELIPE CHARAT
ALFONSO ROSIÑOL
CARLOS DE ALBA PÉREZ
CANAINPES

JOSE CARRANZA
ERNESTO ESCOBAR
JESUS IBARRA
JOHN AZEVEDO
VITO CASTAGNOLA
Pesca Azteca, S.A. de C.V.

GERARDO LOJERO WHEATLEY
Compañía Mexicana de Tunidos, S.A. de C.V.

JOSÉ JUAN VELÁZQUEZ
Supremos del Golfo

SEYCHELLES

J. NAGEON DE LESTANG
Seychelles Fishing Authority

SPAIN

JESÚS MIRANDA
Ministerio de Agricultura, Pesca y Alimentación

GABRIEL SARRÓ IPARRAGUIRRE
O.P.A.G.A.C.

TAIWAN

JAMES SHA
Council of Agriculture of the Executive Yuan
Fisheries Department

INTERNATIONAL ORGANIZATIONS – ORGANIZACIONES INTERNACIONALES

ALAIN FONTENEAU
International Commission for the Conservation of Atlantic Tunas

MICHAEL TILLMAN
International Whaling Commission

CARLOS MAZAL
OLDEPESCA

NON-GOVERNMENTAL ORGANIZATIONS -- ORGANIZACIONES NO GUBERNAMENTALES

HECTOR LOPEZ ROJAS
Fundación para la Defensa de la Naturaleza

KATHLEEN O'CONNELL
CHRISTOPHER STREND
Whale & Dolphin Conservation Society

DAVID C. PHILLIPS
Earth Island Institute

TERESA PLATT
HAROLD MEDINA
STEVE MEDINA
The Fishermen's Coalition

TRACI ROMINE
Greenpeace International

MARCI GLAZER
Center for Marine Conservation

ALEJANDRO VILLAMAR
Red Mexicana de Acción Frente al Libre Comercio

LEESTEFFY JENKINS
ALVARO POSADA-SALAZAR
Humane Society International

DAVID SCHORR
World Wildlife Fund

FRANCISCO HERRERA TERÁN
Asociación Empresarial Pesquera de América Latina

IATTC -- CIAT

JAMES JOSEPH, Director
ALEJANDRO A. ANGANUZZI
DAVID A BRATTEN
RICHARD B. DERISO
MARCO A. GARCIA

MARTIN A. HALL
MICHAEL G. HINTON
CLERIDY E. LENNERT
ROBERT J. OLSON
KURT M. SCHAEFER

APPENDIX 2

AGENDA

55th MEETING OF THE INTER-AMERICAN TROPICAL TUNA COMMISSION

June 13-15, 1995

La Jolla, California

1. Opening of the meeting
2. Adoption of agenda
3. Review of current tuna research
4. The 1994 fishing year
5. Status of tuna stocks
6. Review of tuna-dolphin research and extension programs
7. Review of International Dolphin Conservation Program
8. Recommendations for 1995
9. Recommended research program and budget for FY 1996-1997
10. Place and date of next meeting
11. Election of officers
12. Other business
13. Adjournment

APPENDIX 3

RESOLUTION

The Inter-American Tropical Tuna Commission, having responsibility for the scientific study of the tunas and tuna-like fishes of the eastern Pacific Ocean, and for the formulation of recommendations to the High Contracting Parties with regard to these resources, and having maintained since 1950 a continuing scientific program directed toward the study of those resources,

Notes that the yellowfin tuna resource of the eastern Pacific supports one of the most important surface fisheries for tunas in the world, and

Recognizes, based on past experience in the fishery, that the potential production from the resource can be reduced by excessive fishing effort, and

Recalls that from 1966 through 1979 the implementation of a successful conservation program maintained the yellowfin stock at high levels of abundance, and

Notes that from 1980 through 1994, excepting 1987, although no conservation programs were implemented, conservation measures were recommended to the Commissioners by the scientific staff, and in turn such measures were approved by the Commissioners for recommendation to their respective governments, and

Observes that, although the stock of yellowfin is currently at a level of abundance greater than the optimum, nevertheless it can be over-exploited,

Concludes that, if conditions warrant, a limitation on the catch of yellowfin tuna should be implemented during 1995.

The Inter-American Tropical Tuna Commission therefore recommends to the High Contracting Parties that a quota of 235,000 short tons be established for the 1995 calendar year on the total catch of yellowfin tuna from the CYRA (as defined in the resolution adopted by the Commission on May 17, 1962), and that the Director should be authorized to increase this limit by no more than three successive increments of 20,000 short tons each if he concludes from examination of available data that such increases will pose no substantial danger to the stocks, and

Finally recommends that all member states and other interested states work diligently to achieve the implementation of such a yellowfin conservation program for 1995.