INTER-AMERICAN TROPICAL TUNA COMMISSION

WORKING GROUP ON BYCATCH

MINUTES OF THE 3RD MEETING

La Jolla, California (USA)
5-6 March 2002

AGENDA

1. Opening of the meeting
2. Adoption of the agenda
3. Review of the June 2001 Resolution on Bycatch
4. Review of results of full retention requirement in 2001
5. Review of results of release requirements in 2001:
   (a) sea turtles: bycatches and measures to reduce entanglement in FADs
   (b) other species
6. Evaluation of other measures to obtain bycatch data:
   (a) vessels not covered by the AIDCP On-Board Observer Program:
      (i) small purse-seine vessels
      (ii) longline vessels
   (b) video cameras
7. Status of research
8. Consideration of other measures to reduce bycatch
9. Other business
10. Adjournment

DOCUMENTS

BYC-3-04	Full retention requirement during 2001: Preliminary analysis
BYC-3-05a	Bycatch of sea turtles in the tuna purse-seine fishery
BYC-3-05b	Summary of discard and bycatch data for Class-6 vessels, 1993-2000
BYC-3-06	Evaluation of other measures to obtain bycatch data
BYC-3-07	Proposals for research to address questions relating to reduction of bycatch
BYC-3-08	A strategy to improve the selectivity of the fishery on floating objects

APPENDICES

1. List of attendees
2. Draft resolution on bycatch

The 3rd Meeting of the IATTC Working Group on Bycatch was held in La Jolla, California (USA) on March 5-6, 2002. The attendees are listed in Appendix 1.

1. Opening of the meeting

The Chair of the Working Group, Ing. Luis Torres of Ecuador, opened the meeting.

2. Adoption of the agenda

The provisional agenda was approved as presented.

3. Review of the June 2001 Resolution on Bycatch

Dr. Robin Allen, Director of the Commission, reviewed the resolution, which is in force for the member governments of the Commission.

4. Review of results of full retention requirement in 2001

Dr. Allen presented Document BYC-3-04, a preliminary analysis of compliance with and the results of the full retention requirement during 2001. He noted that the staff had received copies of the discard forms for about 400 of the 766 trips by Class-6 vessels in 2001. About 75% of these forms reported fish being discarded because it was unfit for human consumption or too small to land; the remaining 25% attributed discards to the fact that the amount of fish captured in the last set of the trip was greater than the empty capacity of the vessel. An analysis of data from 441 trips covered by IATTC observers indicates that 317 (72%) of trips with catch had tuna discards, for a total of 17,195 mt, or an average of 54 mt per trip.

With regard to the disposition of catch that would not normally be retained on board, the staff had received 32 of the required unloading report forms, and only 3 of these contained information that was related to the disposition of such catch.

No reports required from governments regarding the disposition of the catch had been received.

Dr. Allen reported that it seemed clear that the reporting envisaged by the 2000 resolution has not been complied with, and unless this situation improves it is hard to see the evaluation concluding anything other than the program has not succeeded in its objective of providing an incentive to avoid catches of small fish.

Mexico made the point that it was very important to examine closely what happens to all the fish when it is unloaded, especially to ensure that the full-retention program is not creating markets for juvenile tunas.

The Working Group concluded that the governments and industry should make much greater efforts to ensure full reporting and compliance with the resolution and the implementing guidelines. It also decided to recommend that the Commission continue the program requiring the full retention and landing of tunas and the release, to the extent practicable, of non-target species for two additional years beginning January 1, 2003, with an annual review of the effect and effectiveness of this program so adjustments can be made if appropriate.

5. Review of results of release requirements in 2001

a. Sea turtles: bycatches and measures to reduce entanglement in FADs

Dr. Allen presented Document BYC-3-05a, regarding the bycatch of sea turtles in the tuna purse-seine fishery during 2001. He reported that during 291 sets, most of them on floating objects, 308 sea turtles were encircled; of these, 70 died during the set, 18 were released with injuries, and the remainder (71%) were released unharmed. Of the 70 turtles killed, 64 died going through the power block. A speedboat was recorded as being launched during only 6 of the 291 sets in which turtles were encircled.

During the 217 sets in which turtles were entangled in the purse-seine net, net roll was stopped during 126 sets to release the turtle, while 89 cases of non-compliance with this requirement were recorded.

Dr. Allen also reported on data showing that sea turtles become entangled in net materials that are hung under FADs.

The European Union made the point that the information presented by the staff does not include data from the national observer programs, and that it is important to receive these data.

Mexico noted that is important to have information on the species of turtles involved in each case.

b. Other species

The staff presented Document BYC-3-05b, with data on the bycatches of various other species in the tuna purse-seine fishery. Several governments expressed concern at the large quantities of non-target species that are captured and discarded. Costa Rica noted its particular concern over the large numbers of dorado that are discarded and asked if the incidental catch of this species included large numbers of juveniles. The staff responded that the age composition of the bycatch was not known, and noted that the information available on the biology and abundance of almost all of the bycatch species was generally very limited, and so the impact of these bycatches on the overall status of the stock of each species could not be well quantified.

6. Evaluation of other measures to obtain bycatch data

a. Vessels not covered by the AIDCP On-Board Observer Program

i. Small purse-seine vessels

The staff presented the salient points contained in Document BYC-3-06 for collecting data from purse-seine vessels of less than 363 mt capacity. Dr. Allen explained that the resolution on bycatch of June 2000 called for the development, for consideration by the Parties, of a program to obtain data on bycatches by purse-seine vessels not covered by the current observer program and by longline vessels and other tuna-fishing vessels. This program is to include consideration of the placement of observers or any alternative data collection system, as appropriate, and should specify the proposed funding mechanisms.

In response to the resolution, with respect to small purse-seine vessels, the staff has prepared a plan to obtain catch data for Class 4 and 5 vessels (182-362 mt carrying capacity), not covered by the current observer program, under which observers would be placed on 20-25% of trips made by these vessels, and all their unloadings would be monitored for two years. On the basis of an analysis of the data obtained, a long-term coverage level would be proposed. For smaller purse-seine vessels and other tuna vessels such as baitboats, the staff would continue the current practice of abstracting vessel logbooks, when available, and incorporating this information into the analyses.

The cost of such an observer program would be approximately US$70,000-80,000. This cost could be borne by vessel owners, as with the AIDCP On-Board Observer Program; with 25% coverage, the vessel assessment would be approximately US$8.00-8.50 per cubic meter. If the Commission wishes to fund the program in this way, it should establish the assessment fee by a resolution. The program would be accounted for separately from the IDCP program.

Several delegations expressed concern about imposing additional costs on industry to cover the cost of observers on small vessels, but at the same time it was recognized that an observer program was the best and most reliable way to obtain data. It was suggested that consideration be given to funding an observer program for smaller vessels from the Commission's budget, and that this possibility be addressed in a future meeting of the Commission.

ii. Longline vessels

Dr. Allen explained that there are two components to this question. The first and most important, in terms of catches, is the fleet of large longliners fishing in the eastern Pacific Ocean. The staff had consulted with Japan to develop an appropriate program to obtain bycatch information for the Japanese fleet, and it appears that such a program will be implemented in the near future.

The second component of the longline fishery is the fleet of relatively small longline vessels based in the region, flying the flags of several states of the region. There are also longline vessels flying the flags of states outside the region, which apparently are based in or licensed by some of the coastal states. As these vessels unload in the region, data on their catches and bycatches may be accessible to IATTC field offices, and hence it may be possible to establish a system for collecting these data different from that for longliners whose catches are not landed in the region. Dr. Allen noted that Document BYC-3-06 included information available to staff on the numbers of such vessels that have fished in the EPO or unloaded tuna in ports of the region.

Japan explained the details of its bycatch data collection program for its longline fleet, explaining that the program would improve both the quantity and quality of its data on bycatches. Japan expressed its disappointment at the lack of response from Korea and Taiwan to requests for information and cooperation. The Working Group as a whole shared this disappointment and asked the Secretariat to continue its efforts to obtain data from these fleets.

Regarding the smaller longline vessels, there was agreement that it was important to obtain as much data from these fleets as possible. Some delegations expressed concern as to the reliability and completeness of the information available to Commission staff with respect to these fleets.

b. Video cameras

The group discussed the possibility of using video cameras for monitoring bycatches on vessels without observers, but decided that, for technical and financial reasons, such an approach was not currently viable.

7. Status of research

The staff presented details of its current research projects on bycatch reduction and three proposals for future investigations, summarized in Document BYC-3-07. The group endorsed the first and third of these in principle, but asked the staff to calculate a budget for carrying them out.

Ecuador announced that it would make available a vessel, and a biologist, to carry out research on bycatch reduction associated with fishing on FADs, focusing on sorting grids and acoustical studies. The results of this research will be reported to the Commission.

8. Consideration of other measures to reduce bycatch

In Document BYC-3-08 the staff presented some alternative strategies for improving the selectivity of the fishery on floating objects in order to reduce bycatches of juvenile tunas, sea turtles, and other species. These ideas were thoroughly discussed by the group, and a number of them, together with other proposals discussed during the meeting, were incorporated in the draft resolution agreed by the group for recommendation to the Commission at its next meeting (Appendix 2).

9. Other business

No other business was discussed.

10. Adjournment

The meeting was adjourned on March 6, 2002.

Appendix 1.

COMISION INTERAMERICANA DEL ATUN TROPICAL
INTER-AMERICAN TROPICAL TUNA COMMISSION

GRUPO DE TRABAJO SOBRE CAPTURA INCIDENTAL
WORKING GROUP ON BYCATCH

3ª REUNION – 3RD MEETING

La Jolla, California (USA)

5 y 6 de marzo de 2002 - March 5-6, 2002

ASISTENTES - ATTENDEES

MIEMBROS--MEMBERS

COSTA RICA

HERBERT NANNE ECHANDI
GEORGE HEIGOLD
ASDRÚBAL VASQUEZ
ALBERTO MORALES
INCOPESCA

ECUADOR

RAFAEL TRUJILLO BEJARANO
LUIS TORRES NAVARRETE
Ministerio de Comercio Exterior, Industrialización y Pesca
CESAR ROHON
Cámara Nacional de Pesquería
BERNARDO BUEHS
ABEL PALADINES
ATUNEC
LUIS E. GOMEZ
LEGALSA, S.A.
MARIO DE GENNA

EL SALVADOR

SONIA SALAVERRIA
Ministerio de Agricultura y Ganadería

GUATEMALA

FRATERNO DIAZ
UNIPESCA

JAPAN - JAPON

DAISHIRO NAGAHATA
KENGO TANAKA
Ministry of Agriculture, Forestry and Fisheries
MIYAKE MAKOTO
EIKO OZAKI
SALLY CAMPEN
Federation of Japan Tuna Fisheries Cooperative Association

MEXICO

RICARDO BELMONTES
CONAPESCA
GUILLERMO COMPEAN
PEDRO ULLOA
Instituto Nacional de Pesca
MICHEL DREYFUS
FIDEMAR

PANAMA

ARNULFO FRANCO
LUIS ESCARRAGA
Autoridad Marítima

UNITED STATES OF AMERICA - ESTADOS UNIDOS DE AMERICA

WILLIAM GIBBONS-FLY
Department of State
SVEIN FOUGNER
NICOLE LEBOEUF
GARY SAKAGAWA
NMFS

DAVID BURNEY
US Tuna Foundation
CARY GANN
Caribbean Marine
PETER FLOURNOY
American Fisherman's Research Foundation

VANUATU

HUGO ALSINA LAGOS
Office of Deputy Commissioner of Maritime Affairs

OBSERVADORES--OBSERVERS

ESPAÑA – SPAIN

FERNANDO CURCIO
Ministerio de Agricultura, Pesca y Alimentación
JAVIER ARIZ TELLERIA
Instituto Español de Oceanografía
ESTANISLAO GARAVILLA
Isabel Conservas Garavilla S.A.

GABRIEL SARRO
OPAGAC
IGNACIO URIBE
Nicra 7

EUROPEAN UNION – UNION EUROPEA

ROBERTO CESARI
CHRISTOPHE LE VILLAIN
European Commission

PERU

JULIO GONZALES
Ministerio de Pesquería

GLADYS CARDENAS
Instituto del Mar del Perú

NON-GOVERNMENTAL ORGANIZATIONS - ORGANIZACIONES NO GUBERNAMENTALES

MOISES MUG
World Wildlife Fund

RUSSELL NELSON
The Billfish Foundation

PERSONAL DE LA CIAT – IATTC STAFF

ROBIN ALLEN, Director
ALEJANDRA FERREIRA
MONICA GALVAN
JOSHUE GROSS

MARTIN HALL
BRIAN HALLMAN
BERTA JUAREZ
NICHOLAS WEBB

Appendix 2.

INTER-AMERICAN TROPICAL TUNA COMMISSION

DRAFT RESOLUTION ON BYCATCH

8 March 2002

The Inter-American Tropical Tuna Commission (IATTC), meeting in (Mexico), on the occasion of its 69th Meeting:

Recalling and reaffirming the Resolutions on Bycatch adopted at the 66th and 68th Meetings of the Commission in June 2000 and June 2001;

Recognizing that a number of the objectives established in these resolutions have not been achieved;

Considering that many of these objectives can be achieved easily and with little expense;

Noting the recommendations of the 3rd meeting of the Working Group on Bycatch in March 2002;

Has agreed as follows:

1. To continue the program requiring the full retention and landing of tunas and the release, to the extent practicable, of non-target species, as described in those Resolutions, for two additional years, beginning January 1, 2003, with an annual review of the effect and effectiveness of this program so adjustments can be made if appropriate;
2. To urge the Parties to ensure that their respective fleets comply fully with the requirements of these resolutions and the guidelines for implementation prepared by the Commission staff;
3. Regarding the reduction of the incidental mortality of juvenile tunas:
    a. To pursue the establishment of mechanisms for communicating information on areas of high concentration of juvenile tunas in real time within the fleet or parts of the fleet, taking account of the importance of ensuring confidentiality of such information;
    b. To support, and seek the necessary funds for, the following future studies and research:

1. Develop technology for releasing juvenile tunas, particularly sorting grids.
2. Apply technology for the identification of species and size composition in schools prior to setting, for example acoustic technology.

4. Regarding sea turtles:
    a. To encourage all the Parties to voluntarily provide the Commission with all data on incidental catches of sea turtles in all fisheries, mainly those for tunas, recognizing that a comprehensive approach is necessary to deal effectively with sea turtle issues;
    b. To encourage FAO to address the conservation and management of sea turtles, including the issue of bycatches of sea turtles as part of such a comprehensive approach;
    c. To fully enforce the requirements of the resolutions regarding releasing captured sea turtles;
    d. That all cases of non-compliance be addressed by the Permanent Working Group on Compliance, and that the Parties apply suitably severe sanctions in such cases to ensure effective compliance [, once all the data for all fisheries have been provided to the Secretariat];
    e. To implement the following actions:

1. Publicize the requirement to release turtles and the other provisions of the Resolutions.
2. Train crews of tuna purse-seine vessels, particularly those without observers, in techniques for handling turtles to improve survival after release, and encourage States to take similar actions for

other tuna fisheries.

3. To study and formulate recommendations regarding modifications of the design of FADs to eliminate entanglement of sea turtles, particularly the use of webbing hanging below FADs.
4. To prohibit tuna-fishing vessels disposing of salt bags or any other type of plastic trash at sea.
5. To encourage the release, when practicable, of sea turtles entangled in FADs.
6. To foster the recovery of FADs when they are not being used in the fishery.

5. To implement the following actions regarding billfish, sharks and rays to further the objectives of the resolution on bycatch of June 2000:

1. Publicize the requirement to release sharks, billfishes and rays, and develop techniques and/or equipment to facilitate the release of these species from the deck or from the net.
2. Seek the necessary funds to carry out experiments to determine the survival rates of released billfish, sharks and rays.
3. Define areas and periods in which any of these species are most likely to be caught.
4. Encourage all Parties, as well as States and fishing entities with vessels fishing for tunas and tuna-like species in the eastern Pacific Ocean, to adopt similar measures, as appropriate.
6. Regarding other species of large pelagic fish of interest to the artisanal fishery, particularly *mahi mahi*, to identify areas of high bycatches of these species, and verify the stability in time and space of any such areas.
7. Regarding bycatches by vessels not already covered by programs to obtain information on such bycatches implemented in accordance with the resolution of June 2000, to pursue actions to obtain such information.
    a. For purse-seine vessels, [PENDING]
    b. For longline vessels, to urge those governments with such vessels operating in the region to provide the required bycatch information as soon as possible.

COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL
INTER-AMERICAN TROPICAL TUNA COMMISSION

WORKING GROUP ON BYCATCH

3RD MEETING

LA JOLLA, CALIFORNIA (USA)
5-6 MARCH 2002

DOCUMENT BYC-3-04

FULL RETENTION REQUIREMENT DURING 2001: PRELIMINARY ANALYSIS

The Commission agreed at its meeting in June 2000 to implement a one-year pilot program to require all purse-seine vessels to first retain on board and then land all bigeye, skipjack, and yellowfin tuna caught, except fish considered unfit for human consumption for reasons other than size, in order to provide a disincentive to the capture of these small fish. It was agreed that another exception could be the final set of a trip, when there may be insufficient well space remaining to accommodate all the tuna caught in that set.

The Commission staff was asked to develop appropriate terms of reference for the development and implementation of the pilot program, to include, inter alia, a definition of the exact time during a set at which full retention would then be required, and a definition of fish unfit for human consumption.

The staff reported to governments in November 2000 its proposal that the program be implemented as follows:

1. No bigeye, skipjack, and/or yellowfin tuna ("tuna") caught by purse-seine vessels may be discarded after the point in the set when the net is fully pursed and more than one half of the net has been retrieved. The tuna may be retained beyond the point when more than one half of the net has been retrieved, provided it is subsequently released alive pursuant to a process or mechanism previously agreed by the Director. If equipment malfunctions affect the process of pursing and retrieving the net in such a way that this rule cannot be complied with, the crew must make efforts to release the tuna as soon as possible.
2. The following two exceptions to the above rule shall apply:
   a. Tuna considered unfit for human consumption for reasons other than size. For each occasion in which tuna that have been caught are discarded for this reason, the following procedures shall apply:
      i. The captain and chief engineer of the vessel must jointly decide that the tuna is unfit for human consumption for reasons other than size and sign a document to that effect, which shall include an explanation of the basis for their decision.
      ii. The document shall also contain other relevant information regarding the tuna caught, *e.g.* how long it was in the net and/or on deck, and the water temperature at the time of capture.
      iii. Any tuna that is to be discarded by a vessel with an observer on board must, if possible, be retained on deck long enough to allow the observer to record the quantity and sizes of the fish and take samples, if required.
   b. Tuna caught during the final set of a trip may be discarded if there is insufficient well space remaining to load all the tuna caught in that set.
3. The disposition of the catch of tuna upon unloading, and in particular the quantity, size, and disposition of the tuna in any portion of the catch which is **not** unloaded to a cannery or transshipped, shall be recorded on a form signed by the captain of the vessel; this form shall be provided to the national authority of the state in which the tuna was unloaded, and a copy shall be provided to the Director.
4. Governments will document the disposition of the catch of tuna upon unloading, in particular the portion of catches not unloaded to canneries or transshipped. This information shall be recorded on a form, a copy of which shall be provided to the Director.

The staff of the Commission's field offices shall assist in monitoring the disposition of unloadings to the extent possible. The field offices and governments will be provided with forms for the certification of tuna discarded at sea pursuant to paragraph 2, as well as for the documentation of the disposition of the catch of tuna upon unloading. The forms will be provided to vessels by the pertinent government or field office.

At its 68th meeting in June 2001 the Commission approved a resolution extending the program into 2002.

1. RESULTS

1.1. Discards at sea

1.1.1. Class-6 vessels

The staff has received copies of the discard report forms described in paragraph 2 above for about 400 of the 766 trips by Class-6 vessels in 2001. About 75% of these forms reported fish being discarded because it was unfit for human consumption or too small to land; the remaining 25% attributed discards to the fact that the amount of fish captured in the last set of the trip was greater than the empty capacity of the vessel. The average discard per trip reported on these forms was about 12 metric tons (mt).

An analysis of data from 441 trips covered by IATTC observers indicates that 317 (72%) of trips with catch had tuna discards, for a total of 17,195 mt, or an average of 54 mt per trip, considerably greater than the average from the discard report forms. The reason for this difference is unknown; however, a more comprehensive analysis based on a comparison of data from individual trips will be available at the Commission meeting in June.

1.1.2. Smaller vessels

The staff has received copies of the discard report forms for 196 trips by vessels smaller than Class-6 in 2001 from a total of 527 trips by these vessels for which the staff has information. As for Class-6 vessels, about 75% of these forms reported fish being discarded because it was unfit for human consumption; the remaining 25% attributed discards to the fact that the amount of fish captured in the last set of the trip was greater than the empty capacity of the vessel. The average discard per trip reported on these forms was 0.25 mt.

1.2. Disposition of catch that would not normally be retained on board

The staff has received 32 of the unloading report forms described in paragraph 3 above. Of those, 29 contained information that was not related to the disposition of the catch that would not normally be retained on board, one recorded a quantity of fish being converted to fish meal, and two reported other sales.

1.3. Reports by Governments

Paragraph 4 above refers to documentation of unloadings by governments. No reports have been received by the staff.

2. ACTION

The 2001 resolution calls for the program to be extended into 2002 and for the Commission to evaluate the results of the program at the end of 2002, to determine whether it should be continued or whether other management measures should be considered. While more complete results will be available later, it seems clear that the reporting envisaged by the 2000 resolution has not been complied with. Unless this situation improves it is hard to see the evaluation concluding anything other than the program did not succeed in its objective of providing an incentive to avoid catches of small fish. The only way to avoid such a conclusion would be for much more effort on the parts of all involved to ensure compliance with the resolution and full reporting.

COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL
INTER-AMERICAN TROPICAL TUNA COMMISSION

WORKING GROUP ON BYCATCH

3RD MEETING

LA JOLLA, CALIFORNIA (USA)
5-6 MARCH 2002

DOCUMENT BYC-3-05a

BYCATCH OF SEA TURTLES IN THE TUNA PURSE-SEINE FISHERY

One of the major objectives of the Agreement for the International Dolphin Conservation Program (AIDCP) is the reduction of the bycatch of all species taken by the purse-seine fishery. The bycatch of sea turtles has been of particular interest because of their endangered or threatened status and because their life-history characteristics are consistent with a population that grows slowly. In October 1999, following the recommendation of the Bycatch Working Group and the objectives of the AIDCP, the IATTC resolved that the States with purse-seine vessels fishing for tunas in the eastern Pacific Ocean (EPO) should require "the release of all sea turtles caught, and report on their number and the condition in which they were released, and that States with other types of fishing vessels operating in EPO encourage these practices to the extent practicable."

In June 2000, a more specific resolution was adopted by the IATTC at the recommendation of the Bycatch Working Group, requiring "fishermen on purse-seine vessels [to] promptly release unharmed, to the extent practicable, all sea turtles, sharks, billfishes, rays, mahi-mahi and other non-target species" and establishing "specific measures for application to encircled or entangled sea turtles as follows:

- Whenever a sea turtle is sighted in the net, a speedboat should be stationed close to the point where the net is lifted out of the water.
- If a turtle is entangled in the net, net roll should stop as soon as the turtle comes out of the water and should not start again until the turtle has been disentangled and released.
- If a turtle is brought aboard the vessel, it should, if necessary, be resuscitated before being returned to the water."

The staff conducted a preliminary analysis of the compliance with these provisions of the 2000 resolution. The *Sea Turtle Records* with information collected in 2001 were examined. The data base contained information from 461 IATTC trips; this does not include approximately 37 trips that were not yet available for this summary, nor does it include data from national programs.

During 291 sets, most of them on floating objects, 308 sea turtles were encircled (Table 1); of these, 70 (23%) died during the set, 18 (6%) were released with serious (5) or slight (13) injuries, and the remainder (71%) were released unharmed. Of the 70 turtles killed, 64 (91%) died going through the power block, 3 (4%) died due to drowning or other causes, and at least 3 (4%) were killed intentionally for later consumption. As is the case for dolphins, all turtles that passed through the power block are considered mortalities, even when the turtle is released alive afterwards, because the injuries sustained are typically serious and likely to be fatal. Passing turtles through the power block is usually preventable, but continues to be a major source of mortality, and runs contrary to both the current and previous IATTC resolutions and the recommendations of the Bycatch Working Group.

A speedboat was recorded as being launched during 6 (2%) of the 291 sets in which turtles were encircled.

During the 217 sets in which turtles were entangled in the purse-seine net, net roll was stopped during 126 sets (58%) to release a turtle, while 89 cases (41%) of non-compliance with this requirement were

recorded. For the remaining sets, information about net roll was not available, or the turtle was released or escaped by other means.

Sea turtles can also become entangled in net materials that are discarded at sea or hung under FADs. In 83 sets, FADs that had sea turtles already entangled in net webbing were encircled. Of the 89 turtles found in these circumstances, 39 (44%) were already dead, 36 (40%) were released unharmed, 10 (11%) were released with serious (2) or slight (8) injuries, 3 (3%) were left entangled, and 1 (1%) died during fishing operations. It should be noted that sea turtles entangled in flotsam-associated nets were often rescued even when no set was made. Of 261 entangled turtles sighted, 67 (26%) were already dead, 122 (47%) were released unharmed, and 29 (11%) were released with serious (9) or slight (20) injuries. Apparently many captains do assume the obligation to release turtles from FAD webbing, regardless of whether they encircle it, to minimize turtle mortality.

Table 1. Number of sets involving sea turtles, number of sea turtles involved, and number of sea turtle mortalities, by set type, during 2001.

Set type	Sets		Turtles		Mortalities	
	No.	%	No.	%	No.	%
Dolphin	44	15.1	44	14.4	7	10.0
Unassociated	34	11.7	39	12.8	18	25.7
Floating object	213	73.2	223	72.9	45	64.3
Total	**291**		**306**		**70**	

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INTER-AMERICAN TROPICAL TUNA COMMISSION

WORKING GROUP ON BYCATCH

3RD MEETING

LA JOLLA, CALIFORNIA (USA)
5-6 MARCH 2002

DOCUMENT BYC-3-06

EVALUATION OF OTHER MEASURES TO OBTAIN BYCATCH DATA

I. Bycatches by vessels not covered by observer programs

As explained in Document IATTC-68-11, prepared for the 68th meeting of the Commission held in June 2001, the resolution on bycatch of June 2000 calls for the development, for consideration by the Parties, of a program to obtain data on bycatches by purse-seine vessels not covered by the current observer program and by longline vessels and other tuna-fishing vessels. This program is to include consideration of the placement of observers or any alternative data collection system, as appropriate, and should specify the proposed funding mechanisms. A program to collect such data was discussed in the above-referenced document, but was not considered by the governments at the 68th meeting. The most salient aspects of the program are repeated below.

1. Small purse-seine vessels

The staff has prepared a plan to obtain catch data for Class 4 and 5 vessels (182-362 mt carrying capacity), not covered by the current observer program, under which observers would be placed on 20-25% of trips made by these vessels, and all their unloadings would be monitored for two years. On the basis of an analysis of the data obtained, a long-term coverage level would be proposed. For smaller purse-seine vessels and other tuna vessels such as baitboats, the staff would continue the current practice of abstracting vessel logbooks, when available, and incorporating this information into the analyses.

The cost of such an observer program would be approximately US$70,000-80,000. This cost could be borne by vessel owners, as with the AIDCP On-Board Observer Program. With 25% coverage, the vessel assessment would be approximately US$8.00-8.50 per cubic meter. If the Commission wishes to fund the program in this way, it should establish the assessment fee by a resolution. The program would be accounted for separately from the IDCP program.

2. Longline vessels

There are two components to this question. The first and most important, in terms of catches, is the fleet of large longliners fishing in the eastern Pacific Ocean (EPO). The staff consulted with Japan to develop an appropriate program to obtain bycatch information for the Japanese fleet, and it appears that such a program will be implemented in the near future. Japan has proposed the following preliminary program for a bycatch data collection system for its longline vessels:

a. First Phase: 2001-2002

The following activities will be conducted as a feasibility study;

i. Japanese commercial tuna longline vessels operating in the EPO will be asked to collect and report bycatch data;

ii. Bycatch data collection would be conducted by possibly two Japanese research vessels in the EPO (chartered commercial tuna longline vessels that will be engaged solely in scientific research activities, with at least one scientist aboard during operations);

iii. The results of i) and ii) above and the accuracy of the data obtained will be reviewed, and the feasibility of continuing these arrangements will be assessed.

These arrangements will cover sharks and seabirds since they are subjects of the FAO International Plans of Action for the conservation and management of sharks and for reducing the incidental catch of seabirds in longline fisheries.

b. Second Phase: 2003 →

The program to be developed and implemented will be based on the results of the first phase.

c. Funds and handling of data

The cost of implementing arrangements of i) and ii) will be borne by Japan. The data obtained will be collected and compiled by the Japanese National Research Institute of Far Seas Fisheries, and thereafter provided to the IATTC staff. Analyses will be conducted jointly by Japan and the IATTC staff. Confidentiality should be ensured for these processes.

The staff has also written to other governments with large longline vessels that fish, but do not unload their catches, in the region, namely the European Union (for Spain), Korea, and Taiwan, but to date has not received any responses regarding their intentions regarding the collection of bycatch data.

The second component of the longline fishery is the fleet of relatively small longline vessels based in the region, flying the flags of several states of the region. There are also longline vessels flying the flags of states outside the region, which apparently are based in or licensed by some of the coastal states. As these vessels unload in the region, data on their catches and bycatches may be accessible to IATTC field offices, and hence it may be possible to establish a system for collecting these data different to that for longliners whose catches are not landed in the region. The table below summarizes the information available on numbers of such vessels that have fished in the EPO or unloaded tuna in ports of the region, by flag.

BLZ	Belize	13
BOL	Bolivia	4
CHN	China	10
COL	Colombia	10
CRI	Costa Rica	81
ECU	Ecuador	113
GTM	Guatemala	18
HON	Honduras	85[1]
IDN	Indonesia	19
MEX	Mexico	79
NIC	Nicaragua	46
PAN	Panama	42
PER	Peru	-[2]
SLV	El Salvador	5
TWN	Taiwan	29
USA	United States	2
VCT	St. Vincent	2
	TOTAL	**558**

The staff has been attempting to obtain more information regarding the scope and activities of this fleet. At present there is not much information available to the staff regarding the catches of these vessels, although several governments are cooperating in providing information.

[1] Includes all Honduran-flag vessels, some of which do not fish in the EPO, and some may fish in the EPO but do not unload their catches in ports of the region

[2] Data unavailable

II. Video cameras to assess bycatches in unobserved vessels

The resolution calls for the Parties to consider alternative data collection systems to estimate bycatches of vessels that are currently unobserved, essentially small purse seiners (less than 363 mt carrying capacity) and longliners. One possibility is the use of video cameras that operate automatically.

In 1994, the staff began tests on a video camera system which could be used on tuna vessels for observing activities related to setting on dolphins. The second of the two prototypes built was deployed in 1998. The camera was designed to be completely self-contained: it carried its own power source, was resistant to the elements and tampering and would not require any intervention by vessel personnel while at sea.

Images were recorded on 8mm Hi8 tape with 4 hours of recording time. Ten seconds of videotape were recorded every 30 minutes during daylight hours. The camera was mounted as high as practical, either halfway up the mast or on top of the pilothouse, and was aimed off the port side of the vessel to film the area where the net is normally deployed during a set.

To adapt this system for monitoring bycatches some technical problems will have to be resolved. Since the camera is completely self-contained, it is limited in power and recording time. To maximize both, the camera should be activated only when catch is loaded aboard the vessel. A system to detect when a set is occurring, and more specifically to detect when catch is brought aboard, would need to be developed. It is estimated that a single prototype would cost approximately US$10,000.

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WORKING GROUP ON BYCATCH

3RD MEETING

LA JOLLA, CALIFORNIA (USA)
5-6 MARCH 2002

DOCUMENT BYC-3-07

PROPOSALS FOR RESEARCH TO ADDRESS QUESTIONS RELATING TO REDUCTION OF BYCATCH

The June 2000 Resolution on Bycatch, *inter alia,* instructed the Director to develop a research program to further evaluate the use of sorting grids as a means of releasing juvenile tunas from purse-seine nets, and facilitate other research to avoid bycatch, including technological innovations such as acoustic instruments. Recently, the staff had discussions with a government and a fishing company concerning the possibility of a support vessel being used as a platform to investigate questions relating to bycatch reduction. In the event, the vessel was not available and the projects were not pursued. However, the staff believes that the research proposals developed, particularly the first and third, address the requirements of the resolution, and they are presented to the Working Group for consideration as a plan that the staff might pursue.

None of these projects are considered in the regular budget of the IATTC, and additional funds would be necessary to carry them out. No detailed estimates of cost have been made.

PROJECT 1: GEAR AND TECHNIQUES FOR REDUCING BYCATCH

1. OBJECTIVE:

To test devices and instruments that can help to reduce the bycatch of small tunas, sharks, and other species during the course of the setting of a purse-seine net on a tuna school.

To understand the spatial stratification, both horizontal and vertical, of the different species captured by the net, with the purpose of developing ways to reduce bycatches.

This study will:

- Test at sea the possibility of using a sorting grid to release small tunas, and small individuals of other species, from the net. This is a follow-up to pilot tests performed by the staff at the IATTC's Achotines Laboratory in Panama, which showed that tunas will swim through a grid if they come into close contact with it.
- Test the possibility of developing devices to capture and release individuals of some species (e.g. sharks, small billfishes) from inside the net, and of devices or structures to facilitate and accelerate the release of those individuals that reach the deck of the vessel alive.
- Observe the behavior of the different species and size groups inside the net during the encirclement process. If spatial segregations are observed, it may be possible to use that knowledge to modify the fishing operation and reduce unwanted captures.

The main questions to be answered are:

If a sorting grid is deployed in the net, will small tunas swim through it? What proportion will survive?

Can sharks and other species be captured and released from the net prior to sack-up? What devices, instruments or tools can be used to do it?

What devices, structures or procedures could be used to ease and accelerate the release from the deck of the vessel of individuals which survive sack-up?

Are the species and size groups in the schools captured distributed homogeneously inside the net during the set (either in a random stable distribution, or in a dynamically unpredictable mix)? If time is allowed for the fish to calm down after being encircled, will their behavior converge towards some spatial stratification (small individuals closer to the surface, *etc*.)? Can this be utilized to increase selectivity?

2. DESCRIPTION:

A purse seiner and a support research vessel will be required for these studies. Captains and crews would be consulted in advance regarding the feasibility and suggested execution of the experiments, and their advice sought with regard to the devices, instruments and procedures to be used.

Sorting grid: A Norwegian researcher experienced in the use of sorting grids in other fisheries will join the team. Ideally, 3-4 sets on floating objects will be made initially to fine-tune the process of deployment, installation, and recovery of the sorting grid; these sets will proceed normally, except for the addition of the grid. Observations of the escape of fish through the grid will be made from a variety of platforms (ROV, cage, inflatable boat with viewing boxes, etc.) Once the process is established, and if fish are escaping, a small net will be installed on the outside of the grid to catch some of them, and they will be retained in a floating pen. This pen (either towed or assembled at sea) will then be towed to a pre-selected anchoring area, where local researchers will make periodic observations to estimate the mortality rates over a 2-week period, if possible. Ideally the process will be repeated for each of the 3 main tuna species, but if not all are present in a set, the process can be repeated after the first 2-week period. If several pens are used, the replicated experiments could be carried on simultaneously.

Release devices: Some observations suggest that some sharks tend to stay at the surface while encircled. If so, and if other individuals are also accessible, it may be possible to develop devices to capture them and release them alive from the net. One possibility might be a small brailer mounted on a speedboat or panga, if available, but consultations with the fishers will be critical in this project.

Spatial structure: During all the sets a variety of platforms and instruments will be used to observe and describe the behavior of the different species inside the net. During some 5 or 6 sets, designated as observation sets, all activity will be suspended for a period of 30 to 60 minutes after completing encirclement, allowing the individuals and schools captured to return to a quasi-normal behavior. Visual (divers in cages, ROV with video) and acoustic (echosounders) observations will be made for a period of one hour, or until the structure is clear and well-described.

Area of operation:	Equatorial eastern Pacific Ocean between 5°N and 5°S, as close to the coast as possible to facilitate the towing and anchoring of the pens.
Start date:	Preferably in a season when coastal FADs could be used successfully.
Duration:	3 months.
Vessels:	Purse seiner and support research vessel.
Materials:	Sorting grids, cages, floating pens, ROV, echosounder, small brailer, other release devices.

Other considerations: Selection of anchorage areas for floating pens; arrangements with local researchers for feeding and monitoring the tunas captured; survival studies using tagged individuals for species which cannot be kept in the pens.

PROJECT 2: TAGGING BIGEYE TUNA (*Thunnus obesus*) CAPTURED BY PURSE-SEINE VESSELS

1. OBJECTIVE:

Tag bigeye tuna captured with purse seines in the equatorial eastern Pacific Ocean with conventional

plastic dart tags, using a support vessel as a platform.

2. DESCRIPTION:

A sample (up to about 5 tons) of tunas caught in sets on drifting fish-aggregating devices (FADs) would be transferred from the purse-seine net to a collapsible floating pen, using techniques similar to those developed for bluefin tuna off Baja California and California. Over a period of 1-2 days the bigeye in the pen would be tagged and released, the pen would then be disassembled and loaded aboard the support vessel ready for the next opportunity for tagging.

Area of operation: Equatorial eastern Pacific Ocean between 5°N and 5°S and between 95°W and 110°W.

Duration: 2 months.

Materials: Collapsible floating pen for the transfer, maintenance, and tagging of up to 5 tons of tunas.

Other considerations: Requires complete cooperation from captains of purse-seine vessels. May potentially provide the foundation for, and only viable means of, tagging large numbers of bigeye tuna in the equatorial EPO. May be useful for developing alternative processing techniques and markets for bigeye caught by purse-seine vessels, such as *sashimi*-grade product.

PROJECT 3: ABUNDANCE AND INTER- AND INTRA-SPECIFIC RELATIONSHIPS OF TUNA SPECIES AND BYCATCH SPECIES ASSOCIATED WITH FADs

1. OBJECTIVE:

Obtain an understanding of the abundance, behavior and acoustic signatures of different tuna species and key bycatch species commonly associated with FADs, and apply this to the development of methods for selective catches of tuna species and reduction of bycatch.

This study will help to understand the movements of tunas and bycatch species associated with FADs in response to changes in the local environment, both physical and biological. Understanding changes in the abundance and the intra- and inter-specific interactions of these organisms may lead to the development of fishing strategies that both minimize bycatch and allow for species-specific selection of the tuna catch. For example, understanding the movements of bigeye and skipjack tunas, sharks and turtles within FAD communities might make fishing strategies possible that would catch the skipjack and exclude the other species. In particular, this study is designed to explore the following questions.

1. Do movements of different tuna species and bycatch species differ within and around FAD communities over the course of a day? For example, do diel changes in abundance differ between tunas and bycatch species or among tuna species? Is there a predictable vertical stratification of tuna species and bycatch species within the community?
2. Are fluctuations in biomass within FAD communities on longer time scales episodic or gradual? Do oceanographic features such as fronts, which are naturally occurring regions of high biomass, contribute significantly to the abundance of small fishes, sharks, turtles, *mahi mahi* and tunas in FAD communities, or does the fauna in FAD communities accumulate largely by random encounters? Are there differences in longer-term fluctuations of biomass between tuna species and bycatch species?
3. Are the presence and abundance of different tunas species, sharks, turtles and *mahi mahi* within FAD communities related to the presence and abundance of smaller fishes such as triggerfish?
4. Can the biomass and movements of tunas and bycatch species within and around FAD communities be determined with acoustic equipment? Are the acoustic signals of the various tuna species and bycatch species sufficiently different to allow the bycatch risk within a particular community to be assessed from shipboard acoustic data?

2. DESCRIPTION:

'Smart' FADs will be deployed for a period of 3 months, and will be tended by a support vessel which will also track tunas and bycatch species fitted with sonic tags.

FADs: FADs will be equipped with GPS, temperature sensors, fluorometers, hydrophones, and video cameras. The temperature sensors, fluorometers, and hydrophones will, in conjunction with the vessel's sonar, be used to assess changes in the physical and biological environment at the FADs over time. The biomass of tunas and bycatch species will be determined from sonar data and video. Hydrophones will be used to evaluate the sounds generated by biological activity at FADs. Divers will also be used to conduct periodic censuses of FAD community species for comparison to sonar and video data, as well as perform any necessary equipment maintenance. Sampling will be conducted from the support vessel, using multi-sensor instrument packages to correlete physical and biological data collected by the sensors attached to the FADs.

Sonic tracking of tuna and bycatch species: A receiver and directional array hydrophone will be installed on the support vessel for sonic tracking of tuna species, sharks and *mahi mahi*. Drifting arrays of acoustic receivers will also be deployed around FADs so that the location and depth of tagged individuals at FADs can be monitored. Sea turtles will be tracked with radiotracking equipment. Active sonic tracking of bigeye and skipjack tunas, as well as sharks, turtles, and *mahi mahi* captured in association with FADs will be conducted for periods of 48 hours. Time-depth profiles of tuna and bycatch species will be used in conjunction with sonar and video camera data to evaluate intra- and inter-specific interactions and acoustic signatures of species and aggregations within the FAD community.

Area of operation:	Equatorial eastern Pacific Ocean between 5°N and 5°S and between 95°W and 110°W.
Start date:	In conjunction with the proposed conventional tuna-tagging experiment.
Duration:	3 months.
Materials:	Vemco VR-1 receivers, coded acoustic transmitters, temperature sensors, fluorometers, hydrophones, and video cameras. Some equipment may be available for loan from scientists at other research institutions.

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5-6 MARCH 2002

DOCUMENT BYC-3-08

A STRATEGY TO IMPROVE THE SELECTIVITY OF THE FISHERY ON FLOATING OBJECTS

In the purse-seine fishery, sets on floating objects produce the greatest quantity of discards of tuna and of most other species. There are various actions which could be taken to reduce bycatches in such sets. The strategy presented here for consideration by the Working Group covers four groups (juvenile tunas; sea turtles; billfish, sharks and rays; large fish of interest to the artisanal fishery). In some cases, where measures or industry practices that might reduce bycatch require investigation, further research is proposed.

Improving performance with respect to bycatch will require a long-term approach; using a strategy such as that presented here as a framework will allow regular monitoring, and adjustment as necessary.

OBJECTIVES

1. REDUCE THE INCIDENTAL MORTALITY OF JUVENILE TUNAS

The Commission extended the pilot program, requiring retention of all bigeye, skipjack and yellowfin tuna caught, into 2002. This measure is intended to encourage vessels to avoid catches of tuna that were too small to be marketable. See document BYC-3-04, *Full retention requirement during 2001: Preliminary analysis*.

a. Immediate action:

With the cooperation of the fleet, it would be possible to establish a system of real-time communication to inform vessels of areas of high concentration of juveniles of those species. However, any such system would have to balance the need for sharing detailed position information and fishermen's interest in not revealing details of their fishing activity to competitors. The information could be transmitted by the observers, and would have to be analyzed and distributed promptly so that the fleet could avoid areas in which high concentrations of juveniles were to be expected.

b. Future actions:

1. Studies of the distribution of juvenile tunas, using fishery and oceanographic data, as a basis for avoiding catches. This might include studies of the dimensions of patches of juveniles, and models to predict their concentrations.
2. Study the spatial stratification of the species in the net as a basis for removing the juveniles from the catch unharmed.
3. Develop technology for releasing small tunas (*e.g.* sorting grid, mesh size).
4. Develop technologies for culturing juvenile bigeye and yellowfin that would otherwise be discarded.

Currently the staff is not actively involved in studies relating to (1) and (2), and starting any substantial research would require new funding or redeployment of staff from other projects. Some preliminary work has been carried out and reported on in respect of (3), and a proposal for a dedicated research program

costing US$320,000 was approved by the Commission, but not funded. In addition to research funding, collaboration with one or more purse-seine vessels is necessary. Proposal (4) would not necessarily reduce the catch of small tunas, but would mean that such catches would not be entirely wasted.

c. Progress towards the objective

Reduce the trend of discards of juvenile tunas (yellowfin and bigeye and skipjack combined) per set on floating object by 5% per year.

2. REDUCE THE BYCATCH OF SEA TURTLES

The 2000 Resolution on Bycatch requires that any turtles taken in a purse-seine net be promptly released unharmed, to the extent practicable. Specifically, retaining live captured turtles is prohibited, certain actions to avoid entangling turtles in the net or to release them if entangled are required, and turtles brought aboard a vessel should, if necessary, be resuscitated before being returned to the water.

Avoiding harm to sea turtles while retrieving the net should be easy, yet some vessels are not complying with this requirement. Active communication from governments and vessel owners to vessel personnel would probably improve this situation; training seminars for captains are also an opportunity, and distributing educational material might also be useful. In respect of (3), a simple comparison of the results of vessels using different FAD designs during normal fishing activities could be carried out with existing staff resources, but such opportunistic comparisons usually do not provide definitive conclusions. A more useful analysis could be carried out with planned trials of different FADs, but this would require the cooperation of a number of vessels. Salt bags and similar trash discarded by tuna vessels have been reported to entangle juvenile turtles, so mortality might be reduced if their discard at sea were prohibited.

a. Future actions

1. Publicize the requirement to release turtles and the other components of the Resolution.
2. Train crews of vessels without observers in techniques for handling turtles to improve survival after release.
3. Modify design of FADs. Sea turtles can become entangled in the mesh that often hangs below FADs; experiment with replacing the mesh with other alternatives (McIntyre kites, lines with weights, *etc*.).
4. Prohibit purse-seine vessels disposing of salt bags or any other type of plastic bag at sea.

b. Progress towards the objective

Reduce the annual incidental mortality of turtles in sets on floating objects to less than 50 through 2003, less than 25 for 2004 through 2010, and less than 10 after 2010.

3. REDUCE THE INCIDENTAL MORTALITY OF BILLFISH, SHARKS AND RAYS

The 2000 Resolution on Bycatch requires that any sharks, billfishes and rays taken in a purse-seine net be promptly released unharmed, to the extent practicable.

At the 66th meeting of the Commission in June 2000 it was reported that nearly 50% of the bycatch of billfish, sharks and rays, but only 10% of the catch of tunas in sets on floating objects, was taken north of 7°N. For these species it would be most productive to focus efforts on bycatch reduction in this area.

a. Future actions

1. Publicize the requirement to release sharks, billfishes and rays, and develop techniques and/or equipment to facilitate the release of these species from the deck or from the net.
2. Carry out experiments to determine the survival rates of released billfish, sharks and rays.
3. Define areas and periods in which manta rays are most likely to be caught.

4. Restrict the fishery on floating objects north of 7°N.

b. Progress towards the objective

Reduce the incidental mortality of these species by 20% between 2002 and 2007.

4. REDUCE THE INCIDENTAL MORTALITY OF SPECIES OF LARGE PELAGIC FISH OF INTEREST TO THE ARTISANAL FISHERY

The 2000 Resolution on Bycatch requires that any *mahi mahi* and other non-target species taken in a purse-seine net be promptly released unharmed, to the extent practicable.

a. Future actions

1. Identify areas of high catches of juveniles of these species, and verify the stability in time and space of any such areas.
2. Consider closures in those areas.

b. Progress towards the objective

Reduce the incidental mortality of these species by 20% between 2002 and 2007.