INTER-AMERICAN TROPICAL TUNA COMMMISSION
COMISION INTERAMERICANA DEL ATUN TROPICAL
QUARTERLY REPORT—INFORME TRIMESTRAL

April-June 2003
Abril-Junio 2003

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The

QUARTERLY REPORT

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of the

INTER-AMERICAN TROPICAL TUNA COMMISSION

is an informal account, published in English and Spanish, of the current status of the tuna fisheries in the eastern Pacific Ocean in relation to the interests of the Commission, and of the research and the associated activities of the Commission's scientific staff. The research results presented should be regarded, in most instances, as preliminary and in the nature of progress reports.

El

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es un relato informal, publicado en inglés y español, de la situación actual de la pesca atunera en el Océano Pacífico oriental con relación a los intereses de la Comisión, y de la investigación científica y demás actividades del personal científico de la Comisión. Gran parte de los resultados de investigación presentados en este informe son preliminares y deben ser considerados como informes del avance de la investigación.

Editor—Redactor:
William H. Bayliff

INTRODUCTION

The Inter-American Tropical Tuna Commission (IATTC) operates under the authority and direction of a convention originally entered into by Costa Rica and the United States. The convention, which came into force in 1950, is open to adherence by other governments whose nationals fish for tropical tunas and tuna-like species in the eastern Pacific Ocean (EPO). Under this provision Panama adhered in 1953, Ecuador in 1961, Mexico in 1964, Canada in 1968, Japan in 1970, France and Nicaragua in 1973, Vanuatu in 1990, Venezuela in 1992, El Salvador in 1997, Guatemala in 2000, and Peru in 2002. Canada withdrew from the IATTC in 1984.

The IATTC's responsibilities are met with two programs, the Tuna-Billfish Program and the Tuna-Dolphin Program.

The principal responsibilities of the Tuna-Billfish Program specified in the IATTC's convention were (1) to study the biology of the tunas and related species of the eastern Pacific Ocean to estimate the effects that fishing and natural factors have on their abundance and (2) to recommend appropriate conservation measures so that the stocks of fish could be maintained at levels that would afford maximum sustainable catches. It was subsequently given the responsibility for collecting information on compliance with Commission resolutions.

The IATTC's responsibilities were broadened in 1976 to address the problems arising from the incidental mortality in purse seines of dolphins that associate with yellowfin tuna in the EPO. The Commission agreed that it "should strive to maintain a high level of tuna production and also to maintain [dolphin] stocks at or above levels that assure their survival in perpetuity, with every reasonable effort being made to avoid needless or careless killing of [dolphins]" (IATTC, 33rd meeting, minutes: page 9). The principal responsibilities of the IATTC's Tuna-Dolphin Program are (1) to monitor the abundance of dolphins and their mortality incidental to purse-seine fishing in the EPO, (2) to study the causes of mortality of dolphins during fishing operations and promote the use of fishing techniques and equipment that minimize these mortalities, (3) to study the effects of different modes of fishing on the various fish and other animals of the pelagic ecosystem, and (4) to provide a secretariat for the International Dolphin Conservation Program, described below.

On June 17, 1992, the Agreement for the Conservation of Dolphins ("the 1992 La Jolla Agreement"), which created the International Dolphin Conservation Program (IDCP), was adopted. The main objective of the Agreement was to reduce the mortality of dolphins in the purse-seine fishery without harming the tuna resources of the region and the fisheries that depend on them. On May 21, 1998, the Agreement on the International Dolphin Conservation Program (AIDCP), which built on and formalized the provisions of the 1992 La Jolla Agreement, was signed, and it entered into force on February 15, 1999. The Parties to this agreement, which in 2003 consisted of Bolivia, Colombia, Costa Rica, Ecuador, El Salvador, the European Union, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, the United States, Vanuatu, and Venezuela, would be "committed to ensure the sustainability of tuna stocks in the eastern Pacific Ocean and to progressively reduce the incidental mortalities of dolphins in the tuna fishery of the eastern Pacific Ocean to levels approaching zero; to avoid, reduce and minimize the incidental catch and the discard of juvenile tuna and the incidental catch of non-target species, taking into consideration the interrelationship among species in the ecosystem."

To carry out these missions, the IATTC conducts a wide variety of investigations at sea, in ports where tunas are landed, and in its laboratories. The research is carried out by a permanent, internationally-recruited research and support staff selected by the Director, who is directly responsible to the Commission.

The scientific program is now in its 53rd year. The results of the IATTC staff's research are published in the IATTC's Bulletin and Stock Assessment Report series in English and Spanish, its two official languages, in its Special Report and Data Report series, and in books, outside scientific journals, and trade journals. Summaries of each year's activities are reported upon in the IATTC's Annual Reports, also in the two languages.

MEETINGS

The background documents and the minutes or chairman's reports of most of the IATTC and AIDCP meetings described below are, or soon will be, available at www.iattc.org.

Meetings of the IATTC and the AIDCP

The following meeting took place in La Jolla, California, USA, in May 2003.

Meeting		Dates
	Meeting of the IATTC	
4	Review of Stock Assessments	May 19-21

The following meetings took place in Antigua, Guatemala, in June 2003.

Meeting		Dates
	Meetings of the IATTC	
4	Permanent Working Group on Compliance	June 20
70	IATTC	June 24-27
	Meetings of the AIDCP	
13	Permanent Working Group on Tuna Tracking	June 17
33	International Review Panel	June 18-19
9	Parties to the AIDCP	June 23
	Joint meeting of the IATTC and the AIDCP	
2	Working Group on Fishing by Non-Parties	June 20

The following resolutions were adopted at the 70th meeting of the IATTC. Readers who are particularly interested in these resolutions can find them at www.iattc.org.

Resolution on IATTC Bigeye Tuna Statistical Document Program – This resolution recommends that the Contracting Parties "require that all bigeye tuna, when imported into the territory of a Contracting Party, be accompanied by an IATTC Bigeye Tuna Statistical Document … or an IATTC Re-export Certificate." This requirement does not apply to bigeye caught by surface gear and "destined principally for canneries." The purpose of this program is "to assist the Commission's effort for the elimination of illegal, unregulated and unreported … fishing."

Resolution on the Adoption of the Convention for the Strengthening of the Inter-American Tropical Tuna Commission Established by the 1949 Convention between the United States of America and the Republic of Costa Rica ("Antigua Convention") – By this resolution, the Commission adopted the Antigua Convention.
Resolution on At-Sea Reporting – In this resolution it was agreed that all observers would be required to transmit weekly reports on "the estimated catch of tuna, by species and set type, and the mortalities of dolphins by stock" to the Secretariat of the AIDCP. It is identical to a resolution on the same subject adopted at the 9th meeting of the Parties to the AIDCP.
Resolution on Data Provision – This resolution recommends that the governments of all members of the IATTC and other states with vessels that participate in the fisheries for tunas and billfishes in the eastern Pacific Ocean (EPO) provide catch and effort data and length-frequency data to the IATTC staff.
Resolution on Financing – This resolution recommends a budget of US$4,866,254 for the IATTC for the fiscal year of October 1, 2003-September 30, 2004, with a schedule of payments for its members.
Resolution on the Establishment of a List of Longline Fishing Vessels over 24 Meters (LSTLFVs) Authorized to Operate in the Eastern Pacific Ocean – In this resolution it was agreed that a list of "large-scale tuna longline fishing vessels (LSTLFVs)" would be established, and that vessels not on that list would not be authorized to fish for tunas and tuna-like species in the EPO.
Consolidated Resolution on Bycatch – This resolution consolidates the several resolutions on bycatch that had been previously agreed on and that create continuing obligations for the governments.
Resolution on the Participation of a Fishing Entity in the Antigua Convention – This resolution calls upon the observer from Taiwan to sign the new IATTC convention "under the name Chinese Taipei."
Resolution on Criteria for Attaining the Status of Cooperating Non-Party or Cooperating Fishing Entity to AIDCP and IATTC – This resolution requires that "non-parties and fishing entities seeking the status of cooperating non-party or fishing entity" supply information on their fishing activities to the IATTC staff and comply with the "conservation measures" of the IATTC and the AIDCP.

Also, a **Recommendation on Sea Turtles** was adopted. It recommends that the "Contracting Parties, as well as States, fishing entities and regional economic integration organizations operating … in the … EPO … provide … the IATTC [with] … information on interactions with sea turtles in the EPO, including both incidental and direct catches and other impacts on sea turtle populations." It also recommends that the IATTC "explore the development of a three-year program that could include mitigation of sea turtle bycatch, biological research on sea turtles, improvement of fishing gears, industry education and other techniques to improve sea turtle conservation."

The following resolutions were adopted at the 9th meeting of the Parties to the AIDCP**.** Readers who are particularly interested in these resolutions can find them at www.iattc.org.

Resolution on Vessel Assessments and Financing – This resolution deals with assessments for the financing of the AIDCP by the vessels listed in the Purse-Seine Capacity List of the IATTC Vessel Register.
Resolution on At-Sea Reporting – In this resolution it was agreed that all vessels would be required to transmit the weekly reports prepared by the observers on "the estimated catch of tuna, by species and set type, and the mortalities of dolphins by stock" to the Secretariat of the AIDCP. It is identical to a resolution on the same subject adopted at the 70th meeting of the IATTC.

Other meetings

Dr. Robert J. Olson attended a meeting of the principal investigators of a new food-web study in Noumea, New Caledonia, on April 28-May 2, 2003. The three-year project, which is funded by a grant from the Pelagic Fisheries Research Program of the University of Hawaii, involves research on the trophic structure (including plankton, forage organisms, and upper-level predators) in the pelagic equatorial eastern, central, and western Pacific Ocean, using stable carbon and nitrogen isotopes and diet analysis. The principal investigators are Dr. Valerie Allain, Secretariat of the Pacific Community, Dr. Felipe Galván-Mangaña, Centro Interdisciplinario de Ciencias Marinas, Instituto Politécnico Nacional (México), Dr. Olson, IATTC, and Dr. Brian N. Popp, University of Hawaii. Dr. Brian Fry (Louisana State University), an internationally-recognized expert in the application of stable isotope techniques to ecological studies, also participated in the meeting. Dr. Olson's travel expenses were paid by the project.

Mr. Brian S. Hallman represented the IATTC at the fourth session of the Preparatory Conference for the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific in Nadi, Fiji, on May 2-12, 2003. The Conference has continued to make progress, and has scheduled its next session for September 2003 in the Cook Islands.

Dr. Richard B. Deriso participated in a meeting of the Scientific and Statistical Committee of the Western Pacific Fisheries Management Council in Honolulu, Hawaii, on May 6-8, 2003. His travel expenses were paid by the Council.

Many members of the La Jolla staff attended all or parts of the 54th Tuna Conference in Lake Arrowhead, California, on May 14-16, 2003. Dr. Shelton J. Harley was chairman of the conference, Dr. Michael G. Hinton was the moderator of the session on fish behavior, and talks were given by Drs. Daniel Margulies and Mark N. Maunder and Ms. Sharon L. Hunt. In addition, research in which Drs. Hinton, Margulies, and Robert J. Olson, Mr. Vernon P. Scholey, and Ms. Jeanne B. Wexler had participated was presented by other speakers, and posters to which Messrs. Mauricio X. Orozco and Marlon H. Román had contributed were shown at the meeting.

Dr. Martín A. Hall, at the invitation of the organizers, participated in a meeting, "Defying Ocean's End," sponsored by Conservation International, in Los Cabos, Mexico, on May 29-June 4, 2003.

DATA COLLECTION

The IATTC has field offices at Las Playas and Manta, Ecuador; Ensenada and Mazatlan, Mexico; Panama, Republic of Panama; Mayaguez, Puerto Rico, USA; and Cumaná, Venezuela.

Personnel at these offices collected 316 length-frequency samples and abstracted logbook information for 346 trips of commercial fishing vessels during the second quarter of 2003. In addition, personnel in La Jolla obtained 36 length-frequency samples of bluefin from recreational fishing vessels.

Also during the second quarter members of the field office staffs placed IATTC observers on 134 fishing trips by vessels that participate in the AIDCP On-Board Observer Program. In addition, 146 IATTC observers completed trips during the quarter, and were debriefed by field office personnel.

Surface fleet and surface catch and catch-per-unit-of-effort statistics

Statistical data are continuously being collected by personnel at the IATTC's field stations and processed at its headquarters in La Jolla. As a result, estimates of fisheries statistics with varying degrees of accuracy and precision are available, the most accurate and precise being those made after all available information has been entered into the data base, processed, and verified. The estimates for the current quarter are the most preliminary, while those made six months to a year after monitoring of the fishery are much more accurate and precise. While it may require a year or more to obtain some final information, much of the catch information is processed and available within two to three months of the return of a vessel from a fishing trip.

Fleet statistics

The estimated total carrying capacity of the vessels that are fishing, or are expected to fish, in the eastern Pacific Ocean (east of 150°W; EPO) during 2003 is about 200,800 cubic meters (m^3) (Table 1). The weekly average at-sea capacity for the fleet, for the weekly periods ending April 6 through June 29, was about 121,900 m^3 (range: 106,600 to 144,800 m^3). The changes of flags and vessel names and additions to and deletions from the IATTC's fleet list during that period are given in Table 2.

Catch and catch-per-unit-of-effort statistics

Catch statistics

The estimated total retained catches of tunas in the EPO during the January 1-June 29, 2003, period, in metric tons, were:

Species	2003	1998-2002			Weekly average, 2003
		Average	Minimum	Maximum	
Yellowfin	229,000	178,000	132,000	224,000	9,000
Skipjack	113,000	103,000	52,000	152,000	4,000
Bigeye	12,000	25,000	15,000	41,000	<1,000

Summaries of the preliminary estimated retained catches, by flag of vessel, are shown in Table 3.

Catch-per-unit-of-effort statistics based on vessel logbook abstracts

The logbook data used in the analyses have been obtained with the cooperation of vessel owners and captains. The catch and effort measures used by the IATTC staff are based on fishing trips landing predominantly yellowfin, skipjack, bigeye, and bluefin tuna. The great majority of the purse-seine catches of yellowfin and skipjack are made by Class-6 vessels (vessels with well volumes greater than 425 m^3), and only data for Class-6 purse seiners are included herein for comparisons among years. There are now far fewer pole-and-line vessels than in previous years, so the data for these vessels are combined without regard to size classes. There are no adjustments included for other factors, such as type of set or vessel operating costs and market prices, which might identify whether a vessel was directing its effort toward a specific species.

Preliminary estimates for the first quarter of 2003 show the catches per day's fishing (CPDFs) of yellowfin north and south of 5°N to have been about 31.2 and 8.5 metric tons (t), respectively (Table 4). During the corresponding periods of 1998-2002 the CPDF of yellowfin by purse seiners in the EPO north of 5°N averaged about 20.7 t (range about 14.3 to 35.1 t), whereas south of 5°N it averaged about 8.8 t (range about 4.2 to 17.7 t).

In general, the greatest catches of skipjack in the EPO are taken in waters south of 5°N. Preliminary estimates for the first quarter of 2003 show the CPDFs of skipjack south and north of 5°N to have been about 14.8 and 1.4 t, respectively (Table 5). During the corresponding periods of 1998-2002 the CPDF of skipjack by purse seiners south of 5°N averaged about 12.4 t (range: about 5.7 to 21.7 t), whereas north of 5°N it averaged about 2.2 t (range: about 0.4 to 5.5 t).

The CPDF of bigeye in the EPO by purse seiners during the first quarter of 2003 is estimated to have been about 2.0 t, which falls within the range of the rates observed during the corresponding periods of 1998-2002 (1.5 to 4.6 t) (Table 6).

There was almost no effort by pole-and-line vessels, and there were no catches of yellowfin, skipjack, or bigeye by these vessels, during the first quarter of 2003.

Size compositions of the surface catches of tunas

The methods for sampling the catches of tunas are described in the IATTC Annual Report for 2000. Briefly, the fish in a well of a purse seiner or pole-and-line vessel are selected for sampling only if all the fish in the well were caught during the same calendar month, in the same type of set (floating-object, unassociated school, or dolphin), and in the same sampling area. These data are then categorized by fishery (Figure 1).

Data for fish caught during the first quarter of 1998-2003 are presented in this report. Two length-frequency histograms are presented for each species. The first shows the data by fishery (area, gear type, and set type) for the first quarter of 2003 and the second shows the first-quarter catches for the current year and the previous five years. There were 219 wells sampled during the first quarter of 2003. No samples were taken from pole-and-line vessels during the first quarter.

There are ten surface fisheries for yellowfin defined for stock assessments: four floating-object, two unassociated school, three dolphin, and one pole-and-line (Figure 1). The last fishery includes all 13 sampling areas. Of the 219 wells sampled, 189 contained yellowfin. The estimated size compositions of these fish are shown in Figure 2a. The catches of yellowfin during the first quarter of 2003 remained high in dolphin sets in the North and Inshore areas, where some of the largest fish were encountered. The catch of yellowfin taken in dolphin sets in the South was low, but the average weight was the greatest of all of the fisheries. Small amounts of yellowfin were taken in floating-object sets, but the estimated catches do not show well in the graphs. A distinct mode between 40 and 60 cm was present in all of the floating-object fisheries, both of the unassociated fisheries, and the Inshore dolphin fishery. Another between 90 and 120 cm was present in all of the floating-object fisheries, and a mode of larger fish between 120 and 160 cm was present in the South dolphin fishery.

The estimated size compositions of the yellowfin caught by all fisheries combined during the first quarter of 1998-2003 are shown in Figure 2b. The size ranges of the fish are generally consistent over time (40-160 cm), but the size distributions differ among quarters and among years. The average weight of yellowfin caught during the first quarter of 2003, 10.0 kg, was similar to that of the first quarter of 2000, but less than those of the first quarters of 2001 and 2002.

There are eight fisheries for skipjack defined for stock assessments: four floating-object, two unassociated school, one dolphin, and one pole-and-line (Figure 1). The last two fisheries include all 13 sampling areas. Of the 219 wells sampled, 140 contained skipjack. The estimated size compositions of these fish are shown in Figure 3a. The greatest catches of skipjack were taken in the Inshore floating-object fishery and the unassociated fishery in the South. Distinct modes of fish between about 30 and 50 cm had been present in the major fishing areas during 2002. These modes persisted in most of the floating-object fisheries and the unassociated fisheries during the first quarter of 2003. Negligible amounts of skipjack (less than 1000 metric tons (t)) were taken in floating-object sets in the Equatorial area.

The estimated size compositions of the skipjack caught by all fisheries combined during the third quarter of 1997-2002 are shown in Figure 3b. The mode of fish between 30 and 50 cm described above is clear in the graphs for the first quarters of 2002 and 2003.

There are seven surface fisheries for bigeye defined for stock assessments: four floating-object, one unassociated school, one dolphin, and one pole-and-line (Figure 1). The last three fisheries include all 13 sampling areas. Of the 219 wells sampled, only 19 contained bigeye. The estimated size compositions of these fish are shown in Figure 4a. The majority of the catch of bigeye was taken by floating-object sets in the South, and most of these fish were between 40 and 75 cm. Small amounts of bigeye were caught in most of the fisheries on floating objects and on unassociated schools (less than 500 t each). Negligible amounts of bigeye (less than 100 t) were taken in the Equatorial floating-object fishery. There were no recorded catches of bigeye in dolphin sets.

The estimated size compositions of the bigeye caught by all fisheries combined during the first quarter of 1998-2003 are shown in Figure 4b. The average weight of bigeye was very low during the first quarter of 2003. It in unclear whether this is an artifact of sampling, since there were only 19 samples of bigeye taken, or whether very few large bigeye were caught during the quarter.

The estimated retained catch of bigeye less than 60 cm in length during the first quarter of 2003 was 3,194 t, or about 60 percent of the estimated total catch of bigeye. The corresponding amounts for the first quarters of 1998-2002 ranged from 501 to 3,991 t.

Observer program

Coverage

The Agreement on the International Dolphin Conservation Program (AIDCP) requires 100-percent coverage by observers on trips by purse seiners with carrying capacities greater than 363 metric tons that fish for tunas in the eastern Pacific Ocean (EPO). This mandate is carried out by the AIDCP On-Board Observer Program, made up of the IATTC's international observer program and the observer programs of Ecuador, the European Union, Mexico, and Venezuela. The observers are biologists trained to collect a variety of data on the mortalities of dolphins associated with the fishery, sightings of dolphin herds, catches of tunas and bycatches of fish and other animals, oceanographic and meteorological data, and other information used by the IATTC staff to assess the conditions of the various stocks of dolphins, study the causes of dolphin mortality, and assess the effect of the fishery on tunas and other components of the ecosystem. The observers also collect data relevant to compliance with the provisions of the AIDCP, and data required for the tuna-tracking system established under the AIDCP, which tracks the "dolphin-safe" status of tuna caught in each set from the time it is captured until it is unloaded (and, after that, until it is canned and labeled).

In 2003 the observer programs of the European Union, Mexico, and Venezuela are to sample half, and that of Ecuador approximately one-third, of the trips by vessels of their respective fleets, while IATTC observers are to sample the remainder of those trips. Except as described in the next paragraph, the IATTC is to cover all trips by vessels registered in other nations that are required to carry observers.

At the fifth meeting of the Parties to the AIDCP in June 2001, observers from the international observer program of the South Pacific Forum Fisheries Agency (FFA) were approved to collect pertinent information for the On-Board Observer Program pursuant to Annex II (9) of the AIDCP in cases when the Director determines that the use of an observer from the AIDCP On-Board Observer Program is not practical.

Observers from the On-Board Observer Program departed on 219 fishing trips aboard purse seiners covered by that program during the second quarter of 2003. Preliminary coverage data for these vessels during the quarter are shown in Table 7.

Training

There were no IATTC observer training courses held during the second quarter of 2003; however, Mr. Ernesto Altamirano participated in a regional observer training course in Suva, Fiji, conducted jointly by the Forum Fisheries Agency (FFA) and the Secretariat for the Pacific Community (SPC) on April 28-May 2, 2003. He discussed issues pertaining to IATTC resolutions, AIDCP requirements and regulations for tuna vessels fishing in the EPO, and the IATTC's observer procedures for the observer trainees and FFA and SPC personnel. Eighteen observers from eight island-nations (Fiji, Nauru, Niue, Palau, Tokelau, Tonga, Tuvalu, and Vanuatu) participated in the course. Mr. Altamirano's travel expenses were paid by the U.S. National Marine Fisheries Service.

Tuna tagging

Bigeye tuna tagging project

Bigeye tuna are being tagged in the equatorial eastern Pacific Ocean (EPO) in order to obtain a more comprehensive understanding of the biology of this species and to obtain reliable estimates of its movement, growth, mortality, and gear interaction parameters for inclusion in stock assessments. Some the results of tagging conducted in 2000 and 2002 are provided in the IATTC Annual Report for 2000, Fishery Bulletin of the U.S. National Marine Fisheries Service, Vol. 100, No. 4, pages 765-788 (viewable at http://fishbull.noaa.gov/1004/11schaef.pdf), and the IATTC Quarterly Report for October-December 2002.

Another bigeye tuna tagging cruise was conducted in the same area from March 1 to May 30, 2003, on the chartered pole-and-line vessel *Her Grace.* The primary objective was to tag and release, using conventional plastic dart tags, large numbers of small bigeye (<100 cm) in the area where purse-seine vessels catch bigeye associated with fish-aggregating devices (FADs). The second objective was to implant archival tags in the peritoneal cavities of bigeye tuna. The third objective was to investigate the fine-scale simultaneous behavior of bigeye and skipjack tunas associated with floating objects, through sonic tracking coupled with echosounder and sonar imaging.

Bigeye tuna were located, tagged, and released in significant numbers in association with TAO buoys, and later in association with the vessel, at approximately 2°S and 2°N on the 95°W meridian. (TAO stands for Tropical Atmosphere Ocean project, which is sponsored by the United States, Japan, and France. The TAO buoys gather oceanographic and meteorological data and relay them to shore.) The numbers of releases were as follows:

Species	Conventional	Archival
Bigeye	8,605	99
Yellowfin	863	8
Skipjack	138	10
Total	9,606	108

The length frequencies of the tagged fish are shown in Figure 5.

Archival tags were implanted into the peritoneal cavities of 89 bigeye tuna, ranging in length from 54 to 136 cm. In general, recoveries of bigeye with archival tags provide information on the movements of individual fish during the entire time they are at liberty, and also important behavioral data, including habitat selection, which, along with the data from recoveries of conventional tags, are useful for stock assessments. Based on evaluations of the performances of the 50 Mk9 archival tags manufactured by Wildlife Computers and the 30 LTD 2310 archival tags manufactured by Lotek Wireless, Inc., over about a 6-week period before they were used, it was determined that they were functioning properly. There were nine recoveries of bigeye with archival tags by the tagging vessel during a single morning of fishing and tagging at a TAO buoy moored at 2°S-95°W. These fish had been released at that location 9 to 18 days previously. Based on evaluations of the data files downloaded, the eight Mk9 and one LTD2310 archival tags all appeared to be functioning, properly, so they were reused on other fish. The data from these nine tags, even though the fish were at liberty for only a short time, provide additional insight into the survival and physiological condition of the fish, and also on the retention of the tags.

New-generation archival tags (Lotek LTD 1100), which record data on depth and ambient temperatures, but not light, were also attached to 10 small bigeye, 8 skipjack, and 10 yellowfin to assess their suitability for future deployments. Those tags, which are designed for external attachment, were secured to the base of the second dorsal fin with a stainless steel wire and a crimped sleeve.

In a continuation of the research undertaken during the 2002 bigeye tuna tagging cruise (IATTC Quarterly Report for April-June 2002), to elucidate the fine-scale behavior of bigeye and skipjack associated with floating objects, bigeye and skipjack were again simultaneously tracked. The fish were tagged with sonic tags implanted in their peritoneal cavities and monitored with a VEMCO VR28 tracking system. The behaviors of a bigeye (85 cm) and a skipjack (67 cm) that had been tagged nearly 36 hours previously near a TAO buoy moored at 2ºN 95ºW were monitored at that buoy, and then the drifting vessel, for 24 hours. A similar study, this time using a 67-cm and a 119-cm bigeye with tags that had been implanted 72 hours previously, was also conducted. In both cases the fish remained with the aggregations with which they were associated at the time that they were tagged.

Video documentation of various aspects of the fishing and tagging activities was obtained. This included one- and two-pole live-bait fishing and subsequent tagging of tunas. Simultaneous underwater video recordings of bigeye feeding on anchovetas chummed from the vessel, biting the "pipe squids" (artificial lures), and being hooked and pulled from the water were also obtained. Some of the most interesting video recordings were obtained with a camera lowered to a depth of about 20 meters and positioned within the aggregation of tunas, including numerous individuals tagged with conventional and archival tags.

Experiments at the Achotines Laboratory

Since March 2001 archival tagging experiments have been conducted at the IATTC's Achotines Laboratory. Tags manufactured by Wildlife Computers and Lotek Wireless, Inc., and provided to the IATTC for these experiments, have been implanted into the peritoneal cavities of captive yellowfin tuna. The objectives of these experiments have been to evaluate the performance of the various generations of archival tags, including the accuracy and precision of the sensors, the estimates of geolocation, the longevity of the tags, and the overall suitability of the tags for use in field studies. In addition, experimental designs have been implemented to investigate thermal data from the peritoneal cavities of the fish for potential signals associated with feeding and spawning.

An experiment was begun on January 16, 2002, by implanting archival tags, provided by Wildlife Computers (model Mk9) and Lotek Wireless, Inc. (model LTD2310) into the body cavities of 12 yellowfin, ranging in weight from 4 to 10 kg, in a 170,000-L tank (Tank 2). The fish were also tagged with conventional plastic dart tags with different color patterns for visual recognition.

The fish were fed to satiation with a diet of chopped squid and bigscale anchovy, once per day, six days per week. Before the food was offered it was thawed, and then held until it had reached the same temperature (to within 0.1°C) as the water in the tank. The amounts of food consumed and the exact times and durations of feeding were recorded. The feeding of individual fish, based on the color-coded tags, was also noted. Records are also maintained of other activities, such as courtship and spawning. Data on the ambient temperature and internal temperature of one fish are shown in Figure 6. The fish was fed at 11:22 a.m., at which time there was a sudden drop of about 0.2°C in its internal temperature, due to the fact that the temperature of the food was less than that of the peritoneal cavity of the fish. It took about six hours for the internal temperature of the fish to return to its previous condition, about 0.2°C above the ambient temperature.

Three fish, all males, with LTD 2310 archival tags were transferred from Tank 2 to Tank 1, the large (1,362,000-L) broodstock tank, on November 27, 2002, to provide more space and potential hormonal stimulus to initiate courtship and spawning. All three died between March and May 2003 from collisions with the tank walls. The archival tag data from one of these fish contained a record for the entire 460 days it was in captivity. It was 84 cm long when it was transferred from Tank 2 to Tank 1 and 95 cm long at the time of its death on April 21, 2003.

Temperature data associated with courtship and subsequent spawning of another fish, recorded by the LTD 2310 archival tag, are shown in Figure 7. Visual monitoring of the fish indicated that the peak of spawning occurred at about 9:50 p.m., which closely matches the peak in the temperature of the peritoneal cavity. This was apparently the result of significantly-increased activity associated with courtship, including rapid swimming as the males chased the females, until the actual spawning event.

The first thermal signal indicative of spawning occurred on December 18. The signal was a rapid increase in peritoneal cavity temperature, followed by a slightly slower cooling after the peak. The times for the increase in temperatures ranged from 20 to 54 minutes, while the decrease in those temperatures ranged from 22 to 56 minutes. From December 18, 2002, through January 4, 2003 a signal, corresponding to the observed times of spawning, occurred every day except December 22. On January 4 the thermal signal became intermittent, which corresponded to a continual decrease in ambient water temperature from 28.3°C to a low of 24.7°C on January 26. The ambient temperature remained between 24.8°C and 25.8°C until February 16, after which it increased to 26.6° C on February 23, then rapidly decreased to 24.6°C on February 28, and then began to increase steadily. From March 3 to April 21 a thermal signal corresponding to spawning times was observed daily (66 out of 67 days), while the ambient water temperature remained above 25.2° C. During the 58-day period of intermittent spawning between January 4 and March 3, spawning occurred on 22 days.

Now that these thermal signals of feeding and spawning events have been validated for captive yellowfin in the laboratory, the next step will be to evaluate data from recovered archival tags implanted in yellowfin released at sea to obtain estimates of the feeding and spawning rates.

Early life history studies

Yellowfin broodstock

The yellowfin broodstock in Tank 1 (1,362,000 L) at the Achotines Laboratory spawned daily during the quarter. Spawning occurred as early as 1:30 p.m. and as late as 8:17 p.m. The water temperatures in the tank ranged from 25.3° to 28.6°C. The numbers of eggs collected after each spawning event ranged from about 71,000 to 1,900,000.

During the quarter four fish died, including one 84-kg male that jumped out of the tank and three 18- to 34-kg-archival-tagged males that struck the tank wall. At the end of June there were three size groups of fish in Tank 1, including three 90- to 100-kg fish, four 44- to 51-kg fish, and one 32-kg fish. Currently, the eight fish in Tank 1 are growing at an estimated rate of 0.04 to 0.11 kg per day.

Efforts to capture live yellowfin were conducted to supplement the broodstock in Tank 1. By the end of the quarter nine 2- to 7-kg yellowfin had been captured and transported to the Laboratory. Archival tags will be implanted in four of these fish that will be placed in Tank 2, and the other five will be held as reserve broodstock for Tank 1. Capture efforts will continue during the third quarter.

Rearing of yellowfin eggs, larvae, and juveniles

During the quarter the following parameters were recorded for most spawning events: times of spawning, egg diameter, duration of egg stage, hatching rate, lengths of hatched larvae, and duration of yolk-sac stage. The weights of the eggs, yolk-sac larvae, and first-feeding larvae, and the lengths and selected morphometrics of these, were measured periodically.

Studies of snappers

The work on snappers (*Lutjanus guttatus*) is carried out by the Dirección General de Recursos Marinos de Panamá.

During the quarter the 32 fish of the snapper broodstock established in 1996 continued to spawn intermittently. The larvae that hatched from fertilized eggs of this broodstock in August 2002 were used for rearing experiments, and at the end of January 2003 there were approximately 4,000 snapper juveniles being maintained in concrete tanks at the Laboratory. In early February about 3,000 of these juveniles were transferred to four floating pens in an estuarine mangrove area about 12 km from the Achotines Laboratory for growth studies. In May about half of these succumbed to an apparent bacterial infection. Currently, the remaining juveniles, which average 28 cm in total length and 310 g in weight, are maintained in two of the floating pens. This project is funded by a grant from Proyectos de Pobreza Rural of the Autoridad Nacional del Ambiente (ANAM) of Panama.

Twenty-nine snappers, averaging 1.6 kg, that had been raised at the Achotines Laboratory from eggs to mature adults, were maintained in Tank 4 during the quarter. These fish had hatched in October 1998 from eggs obtained from the original snapper broodstock that was established in 1996.

Sailfish capture trials

The facilities of the Achotines Laboratory are being used in a joint study with the Aquaculture Program of the Rosenstiel School of Marine and Atmospheric Science, University of Miami, to investigate the feasibility of capturing, transporting, and culturing live sailfish, *Istiophorus platypterus*. The Center for Sustainable Fisheries, University of Miami, is funding these studies. In support of this study, Mr. Vernon P. Scholey spent several days aboard the sportfishing vessel *Picaflor* at Bahia Piñas, Panama, in mid-May to try to catch sailfish for anesthetic trials. One sailfish was held on deck in an anesthetic bath for 18 minutes, and then revived alongside the boat for about 10 minutes, but it did not recover fully after it was released. Efforts to catch and transport live sailfish to the Achotines Laboratory continued during the quarter, but none were captured near the Laboratory.

Visitors

In April the vessel *Go Fisch* and its crew visited the Achotines Laboratory to film part of an episode of "Adventures Off-shore" for ESPN, a television broadcasting company. Also during April, Mr. Guy Harvey and his production crew visited the Laboratory for one day to film part of an episode for a new television series, "Portraits from the Deep," which will be televised in late 2003 or early 2004 on an undetermined network.

The Organization of Tropical Studies (OTS) and the Smithsonian Tropical Research Institute (STRI) jointly offer a graduate course, "Tropical Marine Ecology," in Panama. A portion of the course will be taught at the Achotines Laboratory in July. Several of the instructors visited the Laboratory while surveying sites for the course. Drs. Ilka C. Feller, and Catherine Lovelock of the Smithsonian Environmental Research Center, Edgewater, Maryland, and Dr. Juan L. Maté of STRI visited the Laboratory on June 22-24, 2003. Drs. John S. Pearse and Vicki Buchsbaum Pearse of the Long Marine Laboratory of the University of California at Santa Cruz arrived at the Laboratory on June 21, and were scheduled to stay through July 5. Dr. John Pearse is an instructor for the portion of the graduate course taught at the Laboratory. Dr. Vicki Pearse is collecting *Trichoplax adhaerens*, one of two described species of placozoans, the simplest, and possibly the most primitive, animals, in different parts of the world. She has collected *Trichoplax adhaerens* from waters near Achotines, which is the first time any species of this group has been found in the eastern Pacific Ocean.

Oceanography and meteorology

Easterly surface winds blow almost constantly over northern South America, which causes upwelling of cool, nutrient-rich subsurface water along the equator east of 160ºW, in the coastal regions off South America, and in offshore areas off Mexico and Central America. El Niño events are characterized by weaker-than-normal easterly surface winds, which cause above-normal sea-surface temperatures (SSTs) and sea levels and deeper-than-normal thermoclines over much of the eastern tropical Pacific (ETP). In addition, the Southern Oscillation Indices (SOIs) are negative during El Niño episodes. (The SOI is the difference between the anomalies of sea-level atmospheric pressure at Tahiti, French Polynesia, and Darwin, Australia. It is a measure of the strength of the easterly surface winds, especially in the tropical Pacific in the Southern Hemisphere.) Anti-El Niño events, which are the opposite of El Niño events, are characterized by stronger-than-normal easterly surface winds, below-normal SSTs and sea levels, shallower-than-normal thermoclines, and positive SOIs. Each of the four El Niño events during the 1969-1983 period was followed by greater-than-average recruitment of yellowfin in the eastern Pacific Ocean two years later (Japan. Soc. Fish. Ocean., Bull., 53 (1): 77-80), and IATTC staff members are currently studying data for more recent years to see if this relationship has persisted and to see if it applies to skipjack and/or bigeye.

Two new indices, the NOI* (Progress Ocean., 53 (2-4): 115-139) and the SOI*, have recently been devised. The NOI* is the difference between the anomalies of sea-level atmospheric pressure at the North Pacific High (35°N-130°W) and Darwin, Australia, and the SOI* is the difference between the anomalies of sea-level atmospheric pressure at the South Pacific High (30°S-95°W) and Darwin. The NOI* and SOI* values are both negative during El Niño events and positive during anti-El Niño events.

The area of warm water that was present in the central Pacific Ocean during the first quarter of 2003 (IATTC Quarterly Report for January-March 2003: Figure 9) was absent during the second quarter. The two small areas of cool water that appeared south of the equator between the coast of Ecuador and about 115°W in March consolidated into a band of cool water that extended westward along the equator to about 95°W in April, 145°W in May, and 125°W in June (Figure 8). The data in Table 8, for the most part, indicate that conditions were close to normal during the second quarter of 2003, although the SSTs were somewhat below normal along the equator east of 150°W. Also, the thermocline was quite shallow along the equator from the coast of Ecuador to about 110°W throughout the quarter. Strangely, the SOI* was far below normal in June, a condition that is usually related to above-normal SSTs. Negative anomalies exceeding that have occurred in only five months (May 1951, September 1982, March 1992, September 1994, and August 1997) since January 1948. All but one of these occurred during an El Niño event (IATTC Annual Report for 2001: Figure 16). According to the Climate Diagnostics Bulletin of the U.S. National Weather Service for June 2003, "The latest … forecasts indicate considerable uncertainty for the next several months. However, the majority of the forecasts indicate near neutral conditions … during the last half of 2003. This is consistent with current conditions and recent observed trends."

GEAR PROGRAM

During the second quarter IATTC staff members participated in one dolphin safety-gear inspection and safety-panel alignment procedure aboard a Mexican-flag purse seiner.

IATTC staff members conducted two AIDCP seminars for fishermen, both in La Jolla, California, USA, the first on May 5, 2003, for 8 fishermen and the second on June 19, 2003, for 14 fishermen.

INTER-AGENCY COOPERATION

Dr. Richard B. Deriso and Professor George Sugihara of Scripps Institution of Oceanography (SIO) taught a course in quantitative ecology at SIO during the spring quarter of 2003.

Dr. Deriso participated as Thesis Director in the Ph.D. dissertation defense of Mr. Hector Manzo at the Universidad Autónoma de Baja California, Ensenada, Mexico, on April 9, 2003.

Dr. Michael D. Scott participated in a committee meeting for Mr. Mario Salinas Z., a Ph.D. candidate at the Centro Interdisciplinario de Ciencias Marinas, La Paz, Mexico, on June 27, 2003.

ADMINISTRATION

Ms. Amy French, who was employed temporarily on January 14, 2003, to help Ms. Jenny M. Suter with some aspects of the IATTC's length-frequency data base, completed her work on May 27, 2003.

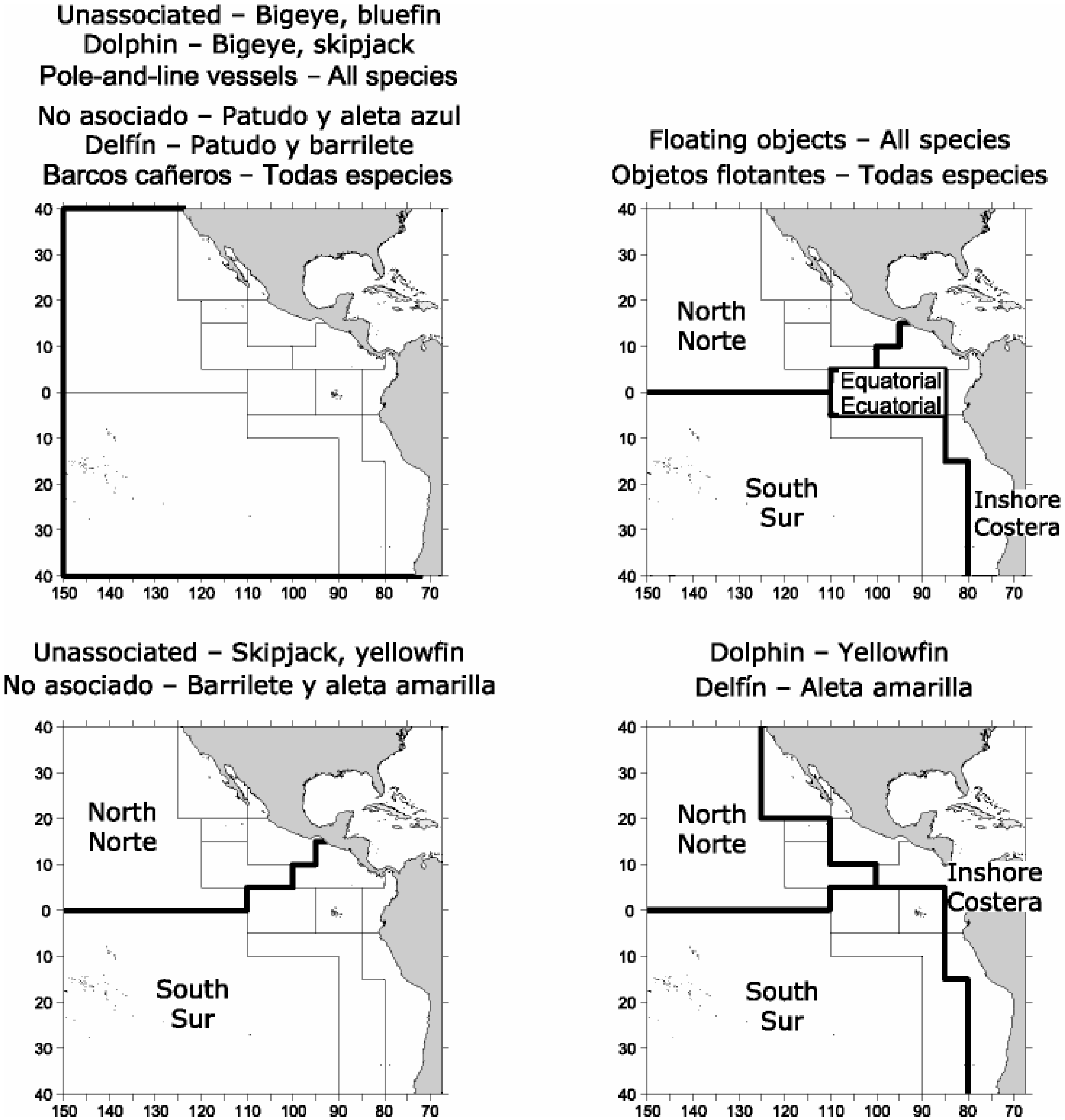

FIGURE 1. Spatial extents of the fisheries defined by the IATTC staff for stock assessment of yellowfin, skipjack, and bigeye in the EPO. The thin lines indicate the boundaries of the 13 length-frequency sampling areas, and the bold lines the boundaries of the fisheries.
FIGURA 1. Extensión especial de las pesquerías definidas por el personal de la CIAT para la evaluación de los stocks de atún aleta amarilla, barrilete, y patudo en el OPO. Las líneas delgadas indican los límites de las 13 zonas de muestreo de frecuencia de tallas, y las líneas gruesas los límites de las pesquerías.

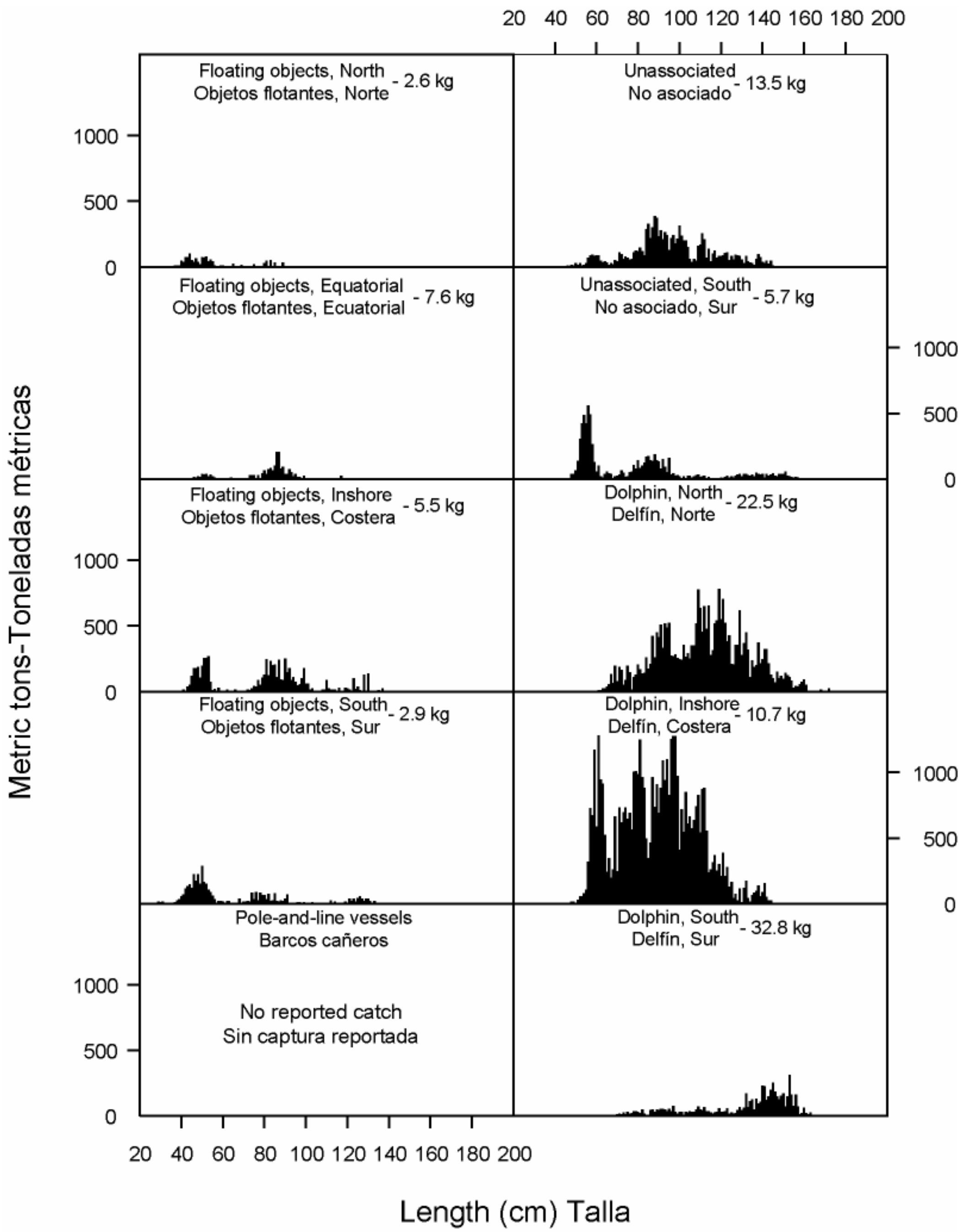

FIGURE 2a. Estimated size compositions of the yellowfin caught in each fishery of the EPO during the first quarter of 2003. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 2a. Composición por tallas estimada para el aleta amarilla capturado en cada pesquería del OPO durante el primero trimestre de 2003. En cada recuadro se detalla el peso promedio de los peces en las muestras.

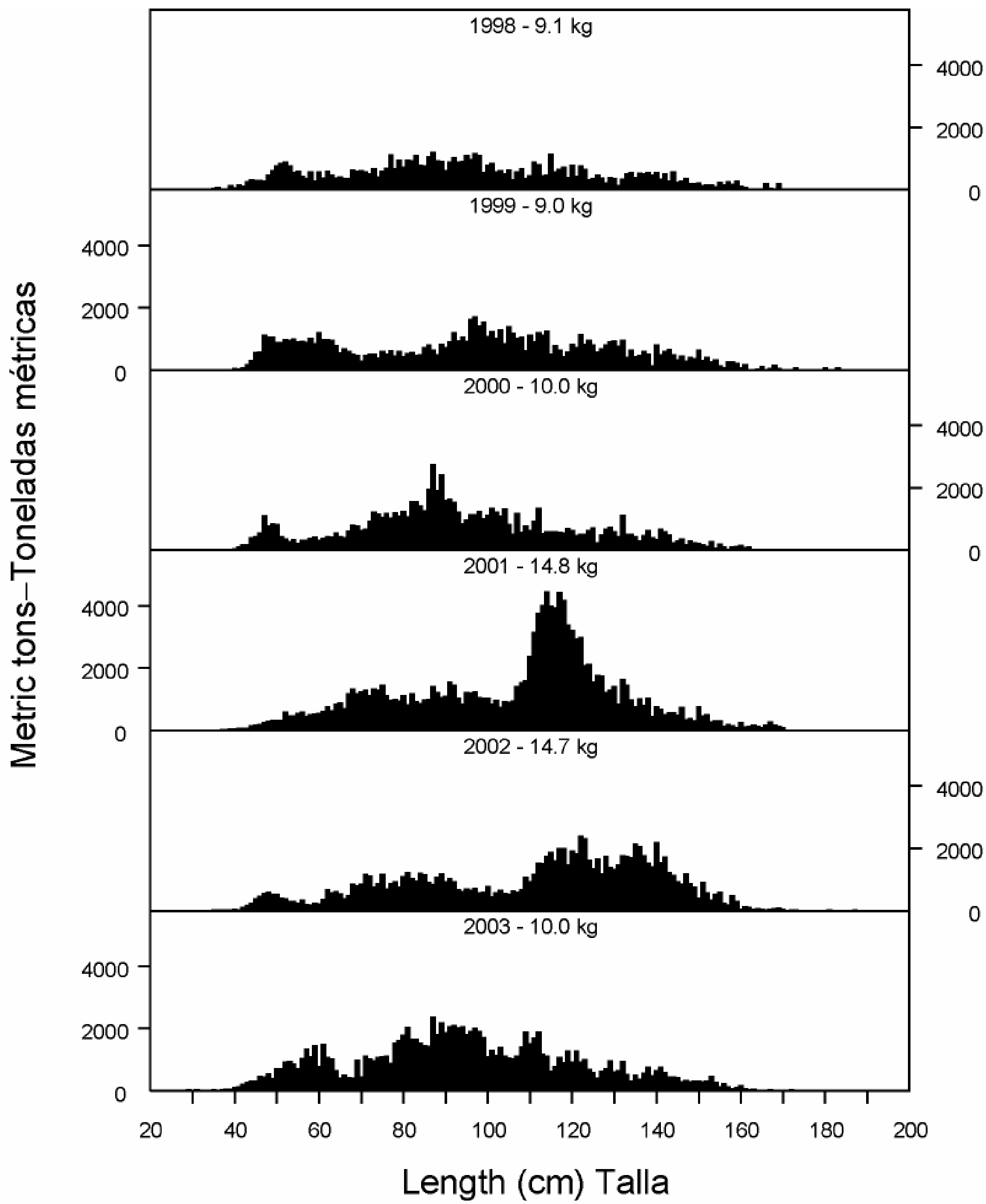

FIGURE 2b. Estimated size compositions of the yellowfin caught in the EPO during the first quarter of 1998-2003. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 2b. Composición por tallas estimada para el aleta amarilla capturado en el OPO en el primero trimestre de 1998-2003. En cada recuadro se detalla el peso promedio de los peces en las muestras.

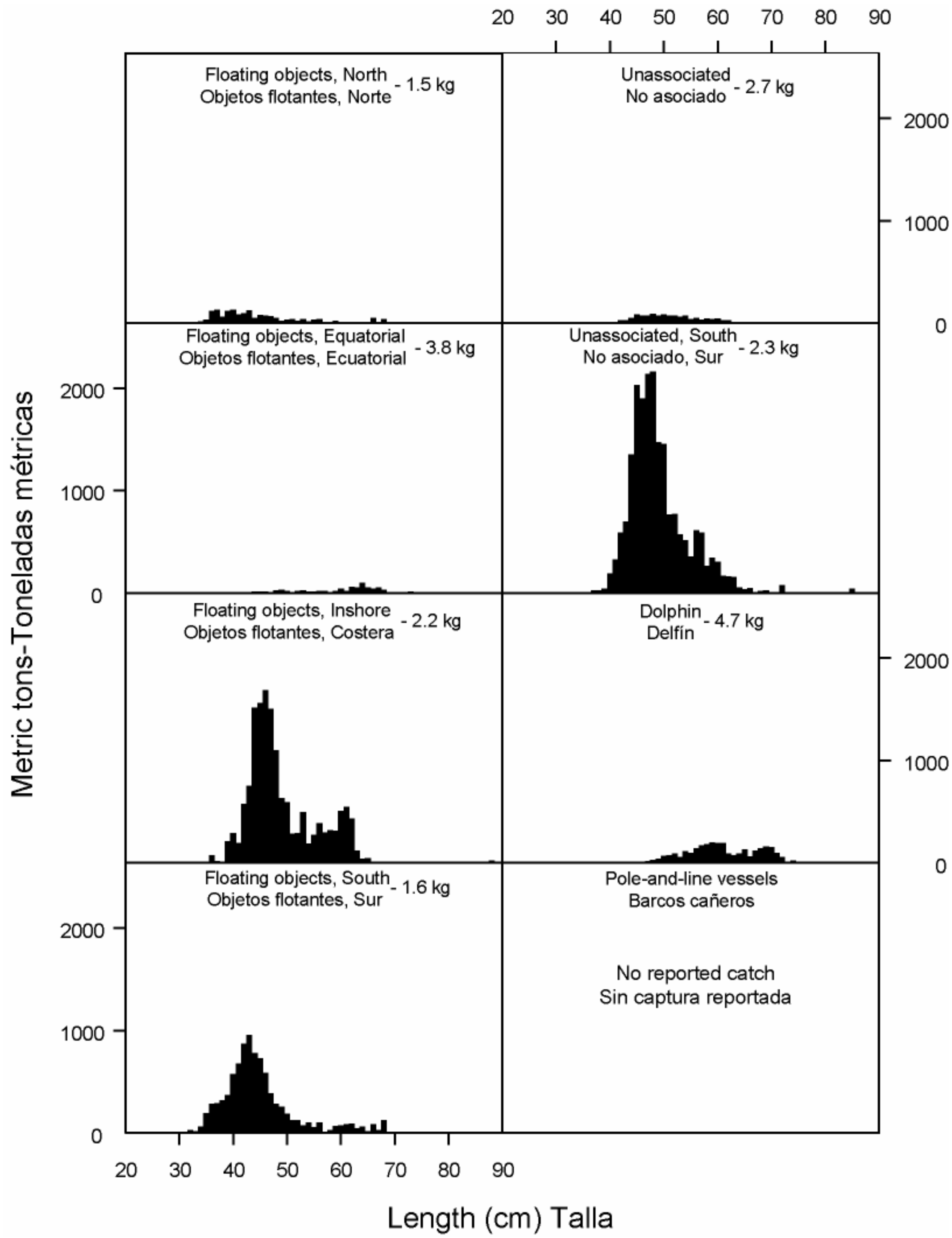

FIGURE 3a. Estimated size compositions of the skipjack caught in each fishery of the EPO during the first quarter of 2003. The average weights of the fish in the samples are given at the tops of the panels.
FIGURA 3a. Composición por tallas estimada para el barrilete capturado en cada pesquería del OPO durante el primero trimestre de 2003. En cada recuadro se detalla el peso promedio de los peces en las muestras.

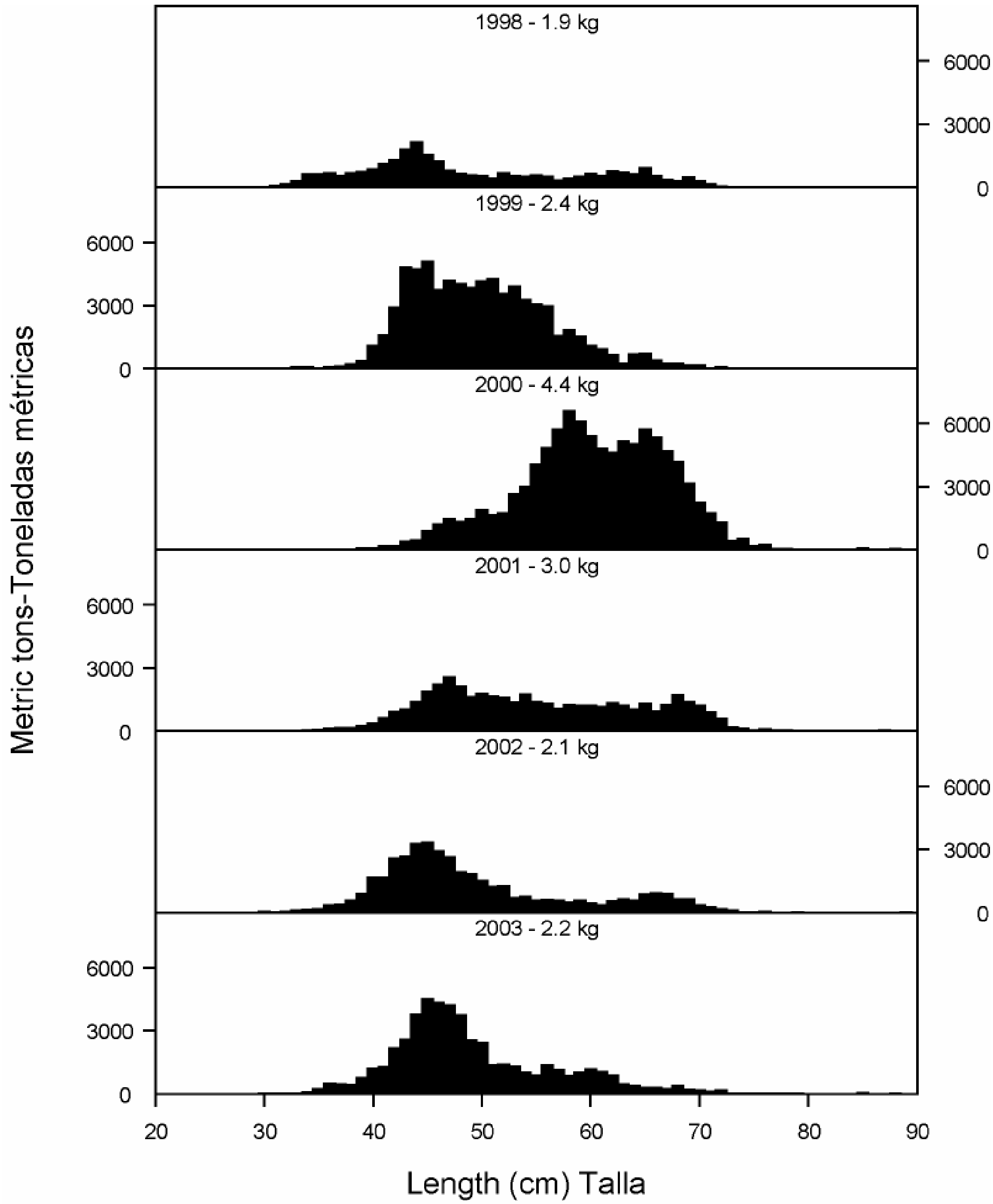

FIGURE 3b. Estimated size compositions of the skipjack caught in the EPO during the first quarter of 1998-2003. The average weights of the fish in the samples are given at the tops of the panels.
FIGURA 3b. Composición por tallas estimada para el barrilete capturado en el OPO en el primero trimestre de 1998-2003. En cada recuadro se detalla el peso promedio de los peces en las muestras.

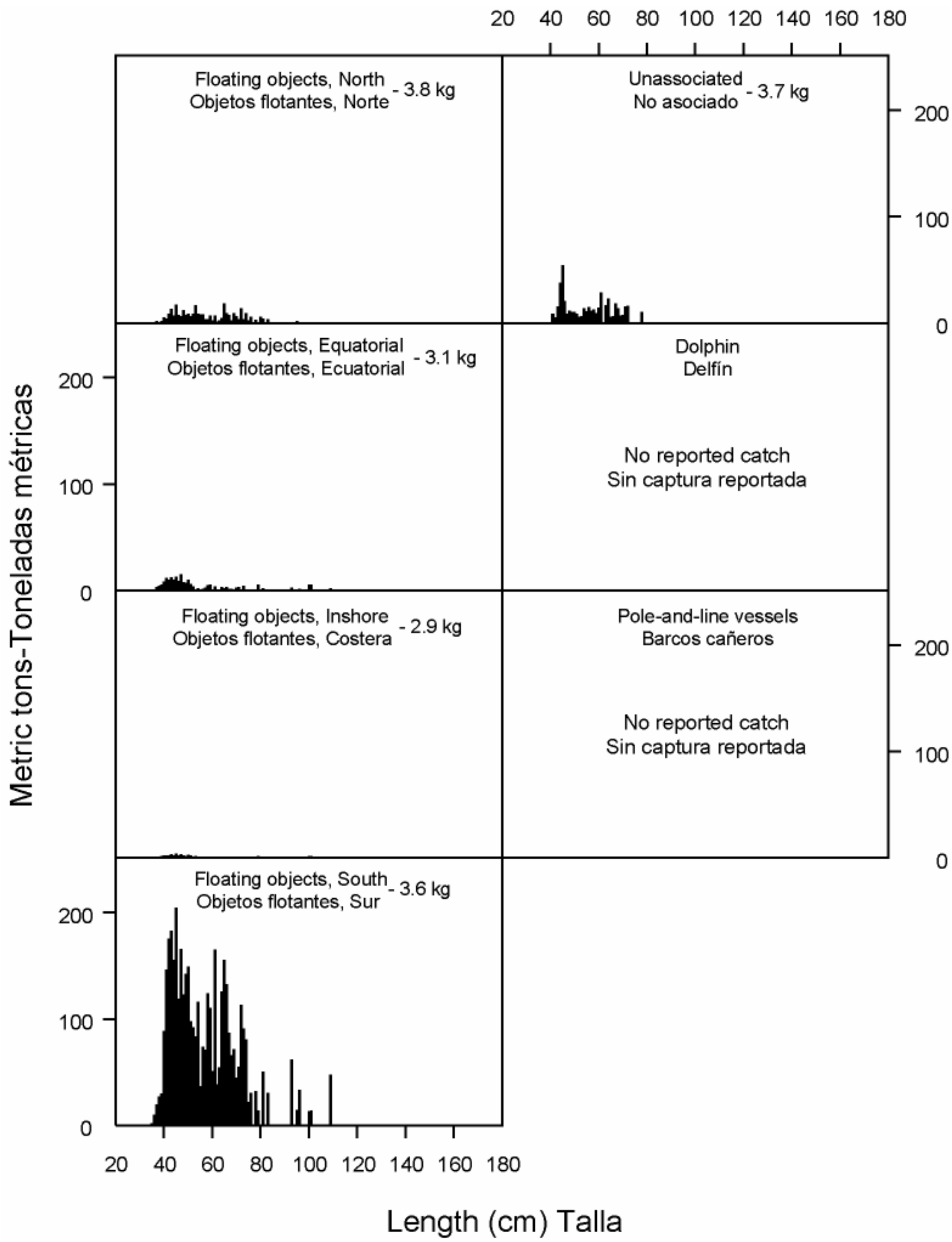

FIGURE 4a. Estimated size compositions of the bigeye caught in each fishery of the EPO during the first quarter of 2003. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 4a. Composición por tallas estimada para el patudo capturado en cada pesquería del OPO durante el primero trimestre de 2003. En cada recuadro se detalla el peso promedio de los peces en las muestras.

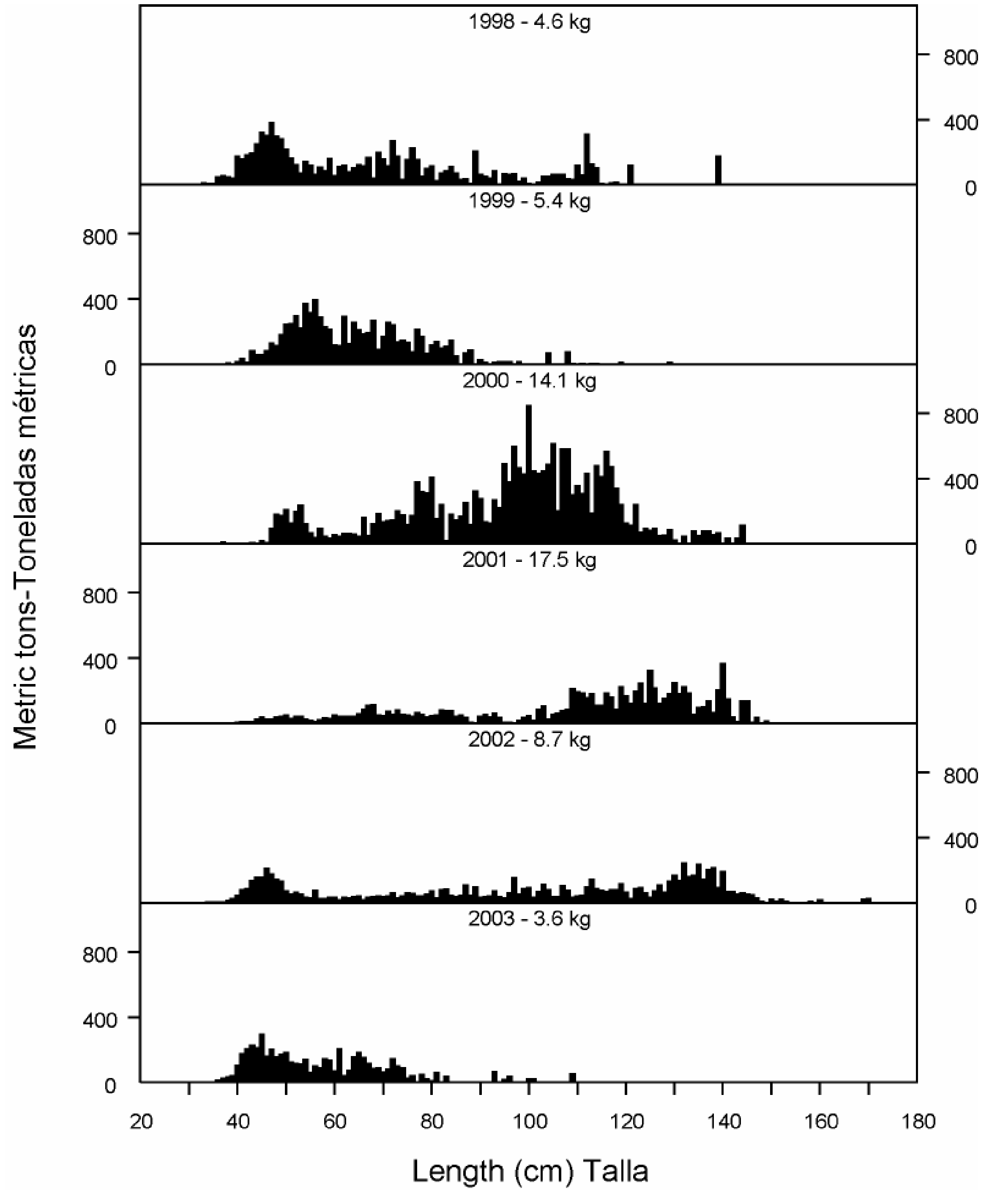

FIGURE 4b. Estimated size compositions of the bigeye caught in the EPO during the first quarter of 1998-2003. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 4b. Composición por tallas estimada para el patudo capturado en el OPO en el primero trimestre de 1998-2003. En cada recuadro se detalla el peso promedio de los peces en las muestras.

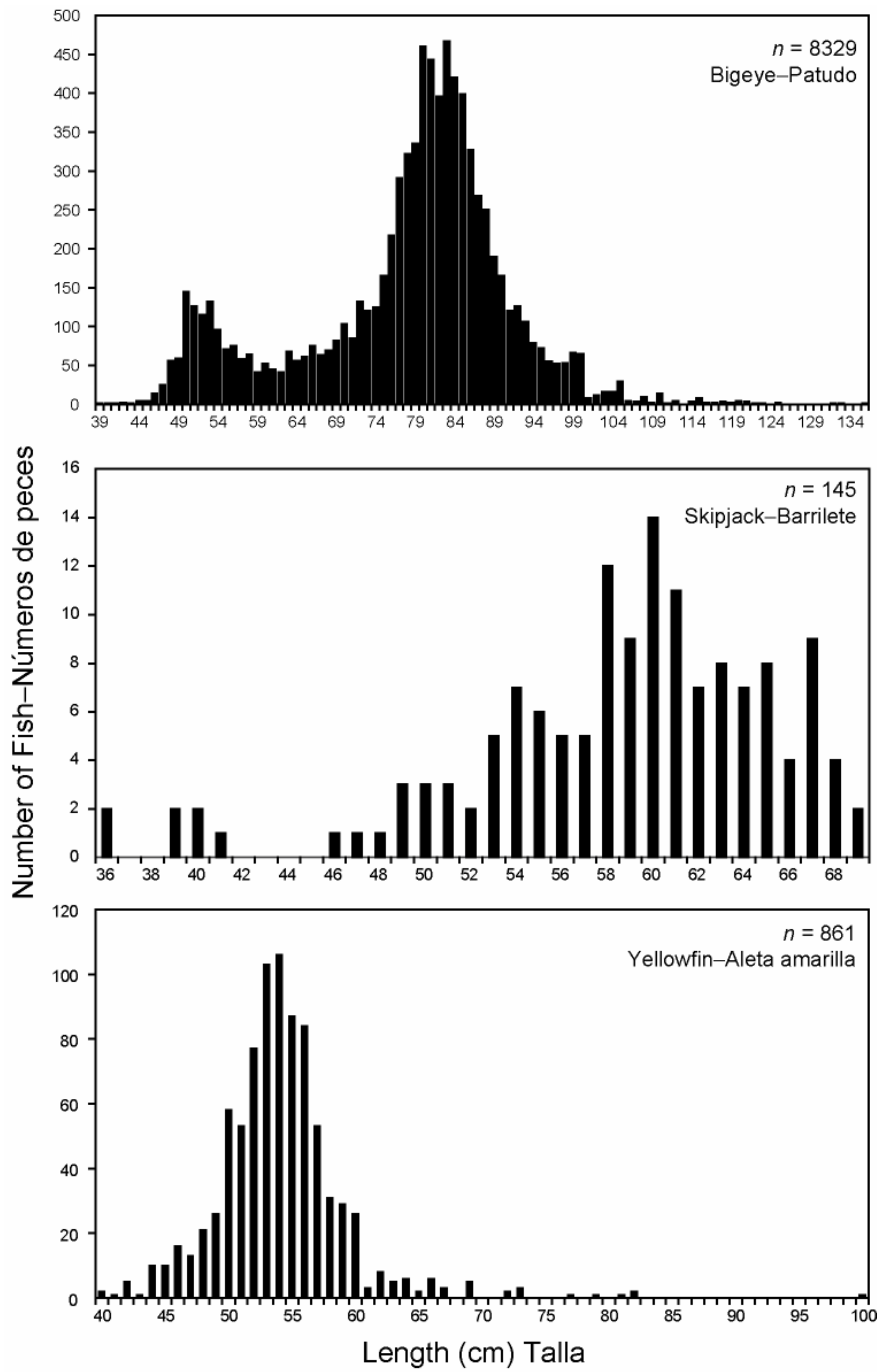

FIGURE 5. Length frequencies of tagged tunas released in the eastern Pacific Ocean during March-May 2003.
FIGURA 5. Frecuencias de talla de atunes marcados liberados en el Océano Pacífico oriental durante marzo-mayo 2003.

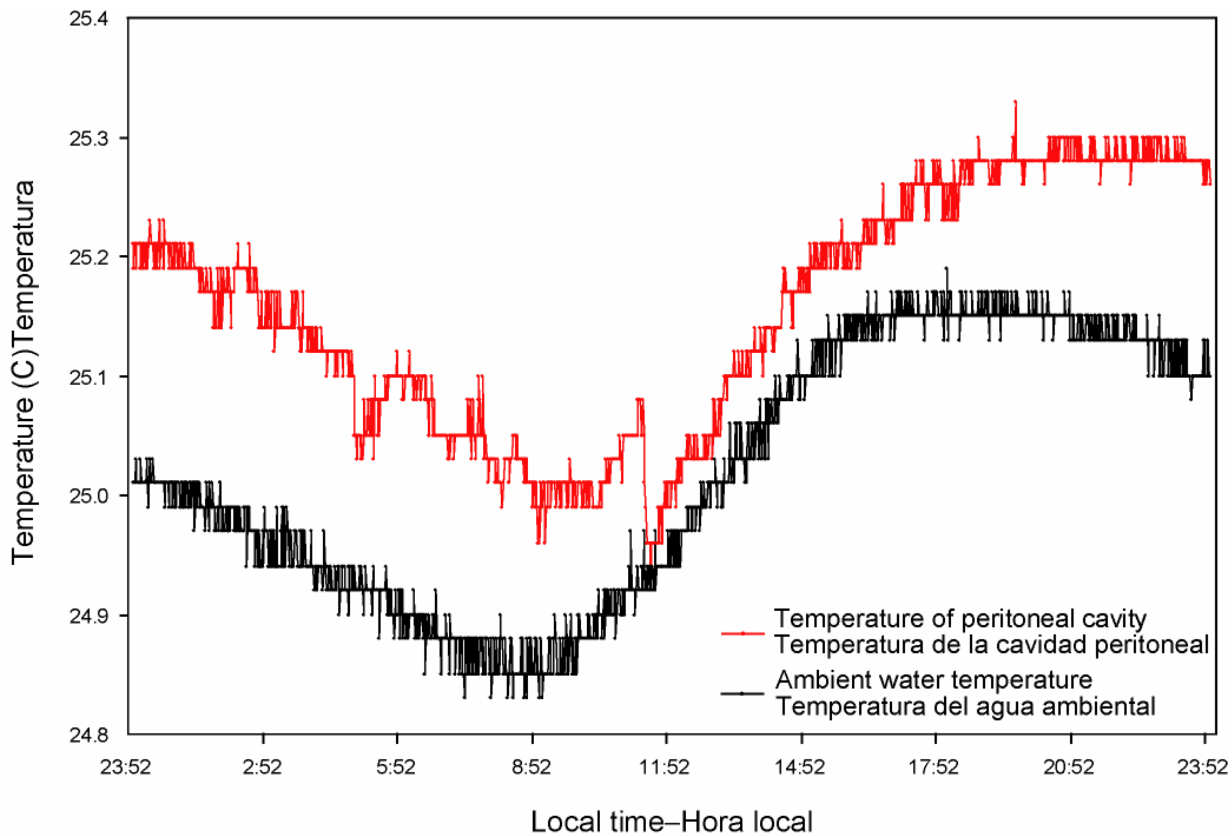

FIGURE 6. Ambient water and peritoneal cavity temperatures recorded with a LTD 2310 archival tag within a captive yellowfin tuna at the Achotines Laboratory. The cycle in these temperatures is caused by the diurnal heating and cooling of the water in the tank; the rapid decrease in peritoneal cavity temperature at 11:22 a.m. corresponds to the recorded time of feeding by the laboratory staff.
FIGURA 6. Temperaturas del agua ambiental y de la cavidad peritoneal registradas con una marca archivadora LTD 2310 en un atún aleta amarilla cautivo en el Laboratorio de Achotines. El ciclo en las dos temperaturas es causado por el calentamiento y enfriamiento diurno del agua en el tanque; la disminución rápida de la temperatura de la cavidad peritoneal a las 1122 horas corresponde a la hora de alimentación de los peces.

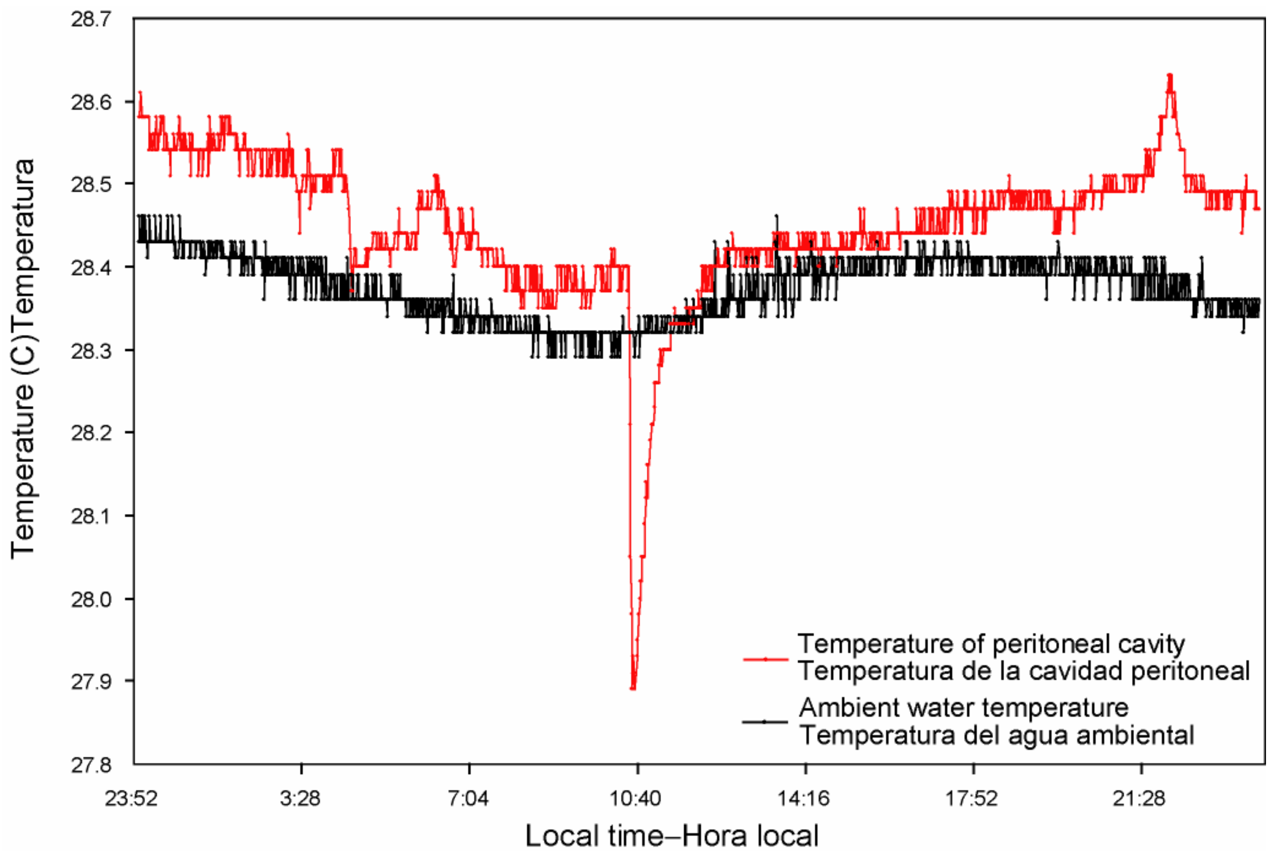

FIGURE 7. Ambient water and peritoneal cavity temperatures recorded with a LTD 2310 archival tag within a captive yellowfin tuna at the Achotines Laboratory. The rapid decrease in peritoneal cavity temperature at 10:28 a.m. corresponds to the time of consumption of food that was not fully thawed. The rapid increase at 9:50 p.m. corresponds to the observed time of spawning.

FIGURA 7. Temperaturas del agua ambiental y de la cavidad peritoneal registradas con una marca archivadora LTD 2310 en un atún aleta amarilla cautivo en el Laboratorio de Achotines. La disminución rápida de la temperatura de la cavidad peritoneal a las 1028 horas corresponde a la hora de consumo de alimento que no estaba completamente descongelado, y el incremento rápido a las 2150 a la hora observada de desove..

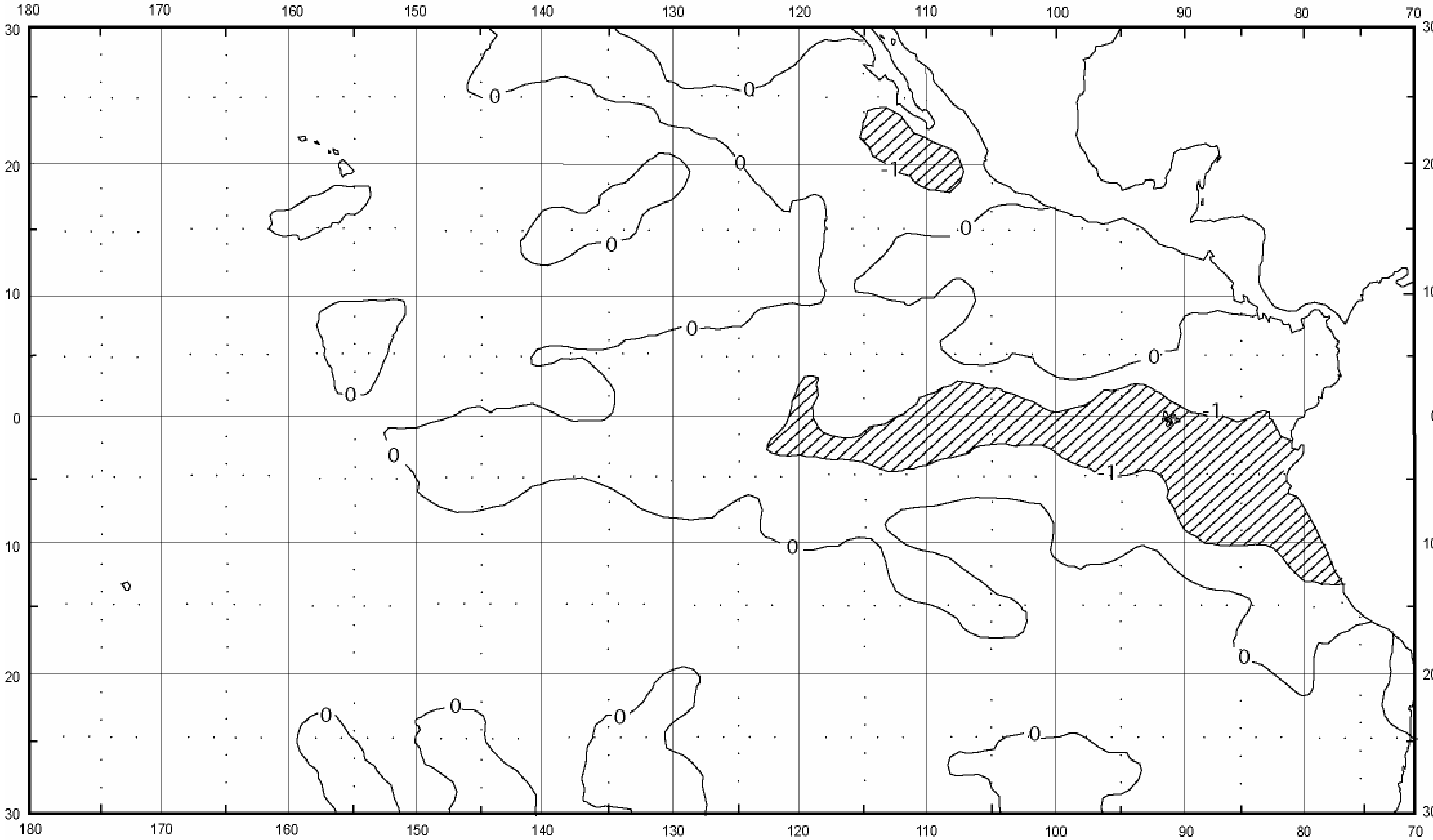

FIGURE 8. Sea-surface temperature (SST) anomalies (departures from long-term normals) for June 2003, based on data from fishing boats and other types of commercial vessels.
FIGURA 8. Anomalías (variaciones de los niveles normales a largo plazo) de la temperatura superficial del mar (TSM) en junio de 2003, basadas en datos tomados por barcos pesqueros y otros buques comerciales.

TABLE 1. Preliminary estimates of the numbers and carrying capacities, in cubic meters, of purse seiners and pole-and-line vessels operating in the EPO in 2003 by flag, gear, and size class. Each vessel is included in the totals for each flag under which it fished during the year, but is included only once in the fleet total. Therefore the totals for the fleet may not equal the sums of the individual flag entries. PS = purse seine; LP = pole-and-line.

TABLA 1. Estimaciones preliminares del número de buques cerqueros y de cañero que pescan en el OPO en 2003, y de la capacidad de acarreo de los mismos, en metros cúbicos, por bandera, arte de pesca, y clase de arqueo. Se incluye cada buque en los totales de cada bandera bajo la cual pescó durante el año, pero solamente una vez en el total de la flota; por consiguiente, los totales de las flotas no son siempre iguales a las sumas de las banderas individuales. PS = cerquero; LP = cañero.

Flag	Gear	Size class—Clase de arqueo							Capacity
Bandera	Arte	1	2	3	4	5	6	Total	Capacidad
				Number—Número					
Belize—Belice	PS	-	-	1	-	-	-	1	209
Bolivia	PS	-	-	2	1	-	7	10	7,910
Colombia	PS	-	-	1	1	2	5	9	7,259
Ecuador	PS	-	7	11	12	9	37	76	47,569
España—Spain	PS	-	-	-	-	-	5	5	12,177
Guatemala	PS	-	-	-	-	-	4	4	7,640
Honduras	PS	-	-	-	-	-	2	2	1,798
México	PS	-	-	5	4	11	38	58	50,469
	LP	-	-	5	-	-	-	5	745
Panamá	PS	-	-		2	-	10	12	14,178
Perú	PS	-	-	-	-	-	2	2	2,018
El Salvador	PS	-	-	-	-	-	3	3	5,686
USA—EE.UU.	PS	-	-	2	-	-	5	7	6,680
Venezuela	PS	-	-	-	-	-	25	25	32,699
Vanuatu	PS	-	-	-	-	-	5	5	5,906
All flags—	PS	-	7	21	20	21	147	216	
Todas banderas	LP	-	-	5	-	-	-	5	
	PS + LP	-	7	26	20	21	147	221	
				Capacity—Capacidad					
All flags—	PS	-	758	3,853	5,622	8,830	181,011	200,074	
Todas banderas	LP	-	-	745	-	-	-	745	
	PS + LP	-	758	4,598	5,622	8,830	181,011	200,819	

TABLE 2. Changes in the IATTC fleet list recorded during the second quarter of 2003. PS = purse seine; LP = pole-and-line.
TABLA 2. Cambios en la flota observada por la CIAT registrados durante el segundo trimestre de 2003. PS = cerquero; LP = cañero.

Vessel name	Flag	Gear	Capacity (m^3)	Remarks	
Nombre del buque	**Bandera**	**Arte**	**Capacidad (m^3)**	**Comentarios**	
Vessels added to the fleet—Buques añadidos a la flota					
Re-entries—Reingresos					
				Now—Ahora	
Juliana Maria	México	PS	829		*María Beatriz*
<u>*Cervantes*</u>	Panamá	PS	775		
Changes of name or flag—Cambios de nombre o pabellon					
				Now—Ahora	
Eillen Marie	Colombia	PS	350	Ecuador	
Rocio Del Pilar	Colombia	PS	191	Ecuador	
San Lorenzo	Ecuador	PS	217		*Amalis*
La Parrula	Venezuela	PS	889	Panamá	
Lucile	Venezuela	PS	1,583	Panamá	*Lucile F*
Vessels removed from fleet—Buques retirados de la flota					
Bonnie	México	PS	1,278		
Don Jose	México	LP	53		

TABLE 3. Preliminary estimates of the retained catches of tunas in the EPO from January 1 through June 29, 2003, by species and vessel flag, in metric tons.

TABLA 3. Estimaciones preliminares de las capturas retenidas de atunes en el OPO del 1 de enero al 29 de junio 2003, por especie y bandera del buque, en toneladas métricas**.**

Flag	Yellowfin	Skipjack	Bigeye	Pacific bluefin	Albacore	Eastern Pacific bonito	Black skipjack	Other[1]	Total	Percentage of total
Bandera	**Aleta amarilla**	**Barrilete**	**Patudo**	**Aleta azul del Pacífico**	**Albacora**	**Bonito del Pacífico oriental**	**Barrilete negro**	**Otras[1]**	**Total**	**Porcentaje del total**
Ecuador	19,692	58,382	5,313	-	-	-	10	18	83,415	23.4
España—Spain	2,796	13,015	2,469	-	-	-	-	-	18,280	5.1
México	98,571	7,555	26	514	-	-	166	-	106,832	30.0
Panamá	16,156	3,828	1,113	-	-	-	-	-	21,097	5.9
Venezuela	53,623	4,162	97	-	-	-	-	-	57,882	16.3
Vanuatú	2,382	7,679	933	-	-	-	2	-	10,996	3.1
Other—Otros[2]	36,032	18,834	2,295	-	-	2	129	58	57,350	16.2
Total	229,252	113,455	12,246	514	-	2	307	76	355,852	

[1] Includes other tunas, mackerel, sharks, and miscellaneous fishes

[1] Incluye otros túnidos, caballas, tiburones, y peces diversos

[2] Includes Bolivia, Colombia, El Salvador, Guatemala, Honduras, Peru, and United States; this category is used to avoid revealing the operations of individual vessels or companies.

[2] Incluye Bolivia, Colombia, El Salvador, Estados Unidos, Guatemala, Honduras, y Perú; se usa esta categoría para no revelar información sobre faenas de buques o empresas individuales

TABLE 4. Logged catches and catches per day's fishing[1] (CPDF) of yellowfin in the EPO, in metric tons, during the period of January 1-March 30, based on fishing vessel logbook information.

TABLA 4. Captura registrada y captura por día de pesca[1] CPDP) de aleta amarilla en el OPO, en toneladas métricas, durante el período de 1 de enero-30 de marzo, basado en información de los cuadernos de bitácora de buques pesqueros.

Area	Fishery statistic Estadística de pesca	Year-Año 1998	1999	2000	2001	2002	2003[2]
	Purse seine—Red de cerco						
North of 5°N	Catch—Captura	35,000	48,200	38,200	38,900	50,500	30,900
Al norte de 5°N	CPDF—CPDP	14.3	15.4	15.7	23.1	35.1	31.2
South of 5°N	Catch—Captura	13,000	9,400	24,300	42,600	18,900	6,600
Al sur de 5°N	CPDF—CPDP	4.2	5.6	8.7	17.7	7.6	8.5
Total	Catch—Captura	48,000	57,600	62,500	81,500	69,400	37,500
	CPDF—CPDP	11.6	13.8	13.0	20.3	27.6	27.2
Annual total Total anual	Catch—Captura	191,900	194,600	195,300	221,100	214,800	

1 Purse-seiners, Class-6 only. The catch values are rounded to the nearest 100, and the CPDF values to the nearest 0.1.

1 Cerqueros de las Clase 6. Se redondean los valores de captura al 100 más cercano, y los de CPDP al 0.1 más cercano.

2 Preliminary

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TABLE 5. Logged catches and catches per day's fishing[1] (CPDF) of skipjack in the EPO, in metric tons, during the period of January 1-March 30, based on fishing vessel logbook information.

TABLA 5. Captura registrada y captura por día de pesca[1] (CPDP) de barrilete en el OPO, en toneladas métricas, durante el período de 1 de enero-30 de marzo, basado en información de los cuadernos de bitácora de buques pesqueros.

Area	Fishery statistic Estadística de pesca	Year-Año					
		1998	1999	2000	2001	2002	2003[2]
	Purse seine—Red de cerco						
North of 5°N	Catch—Captura	2,000	5,800	13,400	3,800	500	1,400
Al norte de 5°N	CPDF—CPDP	0.8	1.8	5.5	2.2	0.4	1.4
South of 5°N	Catch—Captura	17,500	36,100	48,100	20,000	23,200	11,500
Al sur de 5°N	CPDF—CPDP	5.7	21.7	17.2	8.3	9.3	14.8
Total	Catch—Captura	19,500	41,900	61,500	23,800	23,700	12,900
	CPDF—CPDP	5.2	19.0	14.6	7.4	9.1	13.4
Annual total Total anual	Catch—Captura	96,500	161,400	121,000	75,800	69,600	

1 Purse-seiners, Class-6 only. The catch values are rounded to the nearest 100, and the CPDF values to the nearest 0.1.

1 Cerqueros de las Clase 6. Se redondean los valores de captura al 100 más cercano, y los de CPDP al 0.1 más cercano.

2 Preliminary

2 Preliminar

TABLE 6. Logged catches and catches per day's fishing[1] (CPDF) of bigeye in the EPO, in metric tons, during the period of January 1-March 30, based on purse-seine vessel logbook information.

TABLA 6. Captura registrada y captura por día de pesca[1] (CPDP) de patudo en el OPO, en toneladas métricas, durante el período de 1 de enero-30 de marzo, basado en información de los cuadernos de bitácora de buques cerqueros.

Fishery statistic—Estadística de pesca	**Year—Año**					
	1998	**1999**	**2000**	**2001**	**2002**	**2003[2]**
Catch—Captura	4,900	4,500	13,800	6,000	5,100	1,600
CPDF—CPDP	1.5	1.8	4.6	2.4	2.0	2.0
Total annual catch—Captura total anual	18,800	22,200	44,400	29,400	20,600	

1 Class-6 vessels only. The catch values are rounded to the nearest 100, and the CPDF values to the nearest 0.1.

1 Buques de las Clase 6 solamente. Se redondean los valores de captura al 100 más cercano, y los de CPDF al 0.1 más cercano.

2 Preliminary

2 Preliminar

TABLE 7. Preliminary data on the sampling coverage of trips by vessels with capacities greater than 363 metric tons by the observer programs of the IATTC, Ecuador, the European Union, Mexico, Venezuela, and the Forum Fisheries Agency (FFA) during the second quarter of 2003. The numbers in parentheses indicate cumulative totals for the year.

TABLA 7. Datos preliminares de la cobertura de muestreo de viajes de buques con capacidad más que 363 toneladas métricas por los programas de observadores de la CIAT, Ecuador, México, el Unión Europea, Venezuela, y el Forum Fisheries Agency (FFA) durante el segundo trimestre de 2003. Los números en paréntesis indican totales acumulados para el año.

Flag	Trips		Observed by program								Percent observed	
			IATTC		National		FFA		Total			
Bandera	Viajes		Observado por programa								Porcentaje observado	
			CIAT		Nacional		FFA		Total			
Bolivia	10	(26)	7	(20)					7	(20)	70.0	(76.9)
Colombia	6	(15)	6	(15)					6	(15)	100.0	(100.0)
Ecuador	80	(135)	53	(94)	27	(41)			80	(135)	100.0	(100.0)
España—Spain	5	(16)	2	(9)	3	(7)			5	(16)	100.0	(100.0)
Guatemala	4	(11)	4	(11)					4	(11)	100.0	(100.0)
Honduras	3	(8)	3	(8)					3	(8)	100.0	(100.0)
México	54	(130)	26	(67)	28	(63)			54	(130)	100.0	(100.0)
Panamá	16	(31)	15	(30)	1[2]	(1)			16	(31)	100.0	(100.0)
Perú	2	(5)	2	(5)					2	(5)	100.0	(100.0)
El Salvador	6	(12)	6	(12)					6	(12)	100.0	(100.0)
U.S.A.—EE.UU.	0	(6)	0	(5)			0	(1)	0	(6)	-	(100.0)
Venezuela	27	(74)	13	(36)	14	(38)			27	(74)	100.0	(100.0)
Vanuatu	9	(20)	9	(20)					9	(20)	100.0	(100.0)
Total	222	(489)[1]	146	(332)	73	(150)	0	(1)	219	(483)[1]	98.6	(98.8)

[1] Includes 32 trips (24 by vessels with observers from the IATTC program, 7 by vessels with observers from the national programs, and 1 by an observer from the FFA program) that began in late 2002 and ended in 2003

[1] Incluye 32 viajes (24 por observadores del programa del CIAT, 7 por observadores de los programas nacionales, y 1 por un observador del programa FFA) iniciados a fines de 2002 y completados en 2003

[2] Sampled by the Venezuelan national program. It was not known at the time that the vessel had changed flag from Venezuela to Panama just prior to the trip departure.

[2] Muestreado por el programa nacional venezolano. No se supo en ese momento que el buque había cambiado de pabellón de Venezuela a Panamá justo antes de comenzar el viaje.

TABLE 8. Oceanographic and meteorological data for the Pacific Ocean, January-June 2003. The values in parentheses are anomalies.
TABLA 8. Datos oceanográficos y meteorológicos del Océano Pacífico, Enero-Junio 2003. Los valores en paréntesis son anomalías.

Month—Mes	**1**	**2**	**3**	**4**	**5**	**6**
SST—TSM, 0°-10°S, 80°-90°W (°C)	24.4 (-0.1)	25.8 (-0.2)	26.0 (-0.5)	24.4 (-1.0)	22.5 (-1.8)	21.6 (-1.4)
SST—TSM, 5°N-5°S, 90°-150°W (°C)	26.4 (0.8)	26.7 (0.3)	27.3 (0.2)	27.2 (-0.3)	26.1 (-0.9)	25.8 (-0.6)
SST—TSM, 5°N-5°S, 120°-170°W (°C)	27.8 (1.2)	27.5 (0.8)	27.8 (0.7)	27.8 (0.1)	27.4 (-0.4)	27.5 (0.0)
SST—TSM, 5°N-5°S, 150W°-160°E (°C)	29.3 (1.1)	29.0 (1.0)	29.0 (0.9)	29.0 (0.6)	28.9 (0.3)	29.1 (0.4)
Thermocline depth—Profundidad de la termoclina, 0°, 80°W (m)	40	25	20	20	30	40
Thermocline depth—Profundidad de la termoclina, 0°, 110°W (m)	80	60	40	40	30	25
Thermocline depth—Profundidad de la termoclina, 0°, 150°W (m)	150	140	140	110	120	140
Thermocline depth—Profundidad de la termoclina, 0°, 180°W (m)	150	150	150	150	160	170
Sea level—Nivel del mar, La Libertad, Ecuador (cm)	220.6 (-10.0)	225.6 (-6.1)	226.9 (-3.7)	223.0 (-7.8)	231.9 (-0.4)	228.1 (-4.8)
Sea level—Nivel del mar, Callao, Perú (cm)	111.8 (0.3)	101.1 (-13.0)	110.6 (-4.1)	103.1 (-11.4)	106.7 (-6.8)	103.3 (-8.7)
SOI—IOS	-0.4	-1.2	-1.0	-0.4	-0.6	-1.1
SOI*—IOS*	1.50	1.32	-2.07	0.16	1.21	-6.29
NOI*—ION*	-2.52	-0.07	-0.57	-2.63	-0.76	-2.72