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

January-March 2003
Enero-Marzo 2003

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The

QUARTERLY REPORT

January-March 2003

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

INFORME TRIMESTRAL

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COMISION INTERAMERICANA DEL ATUN TROPICAL

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 which 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

10th meeting of the Working Group on the IATTC Convention

This meeting was held in La Jolla, California, on March 18-23, 2003.

Other meetings

Dr. Shelton J. Harley attended a workshop, Testing of Spatial Structure Models, at Scripps Institution of Oceanography, La Jolla, California, on January 21-24, 2003.

Dr. Richard B. Deriso participated in a meeting of the Scientific and Statistical Committee of the Western Pacific Fishery Management Council of the United States in Honolulu, Hawaii, on January 28-30, 2003. His travel expenses were paid the by the Western Pacific Fishery Management Council.

Dr. Martín A. Hall participated in the International Technical Expert Workshop on Marine Turtle Bycatch in Longline Fisheries in Seattle, Washington, on February 11-13, 2003. At the workshop, which was organized by NOAA [National Oceanic and Atmospheric Administration]-Fisheries, the participants discussed possible actions to reduce the bycatches of turtles and the impacts of implementation of those actions. His travel expenses were paid by the U.S. National Marine Fisheries Service.

Dr. Hall attended the Annual Meeting of the American Association for the Advancement of Science in Denver, Colorado, on February 14-18, 2003. On February 17 he participated in the Symposium on Conserving Migratory Marine Organisms: Protecting Animals with Ocean-Sized Habitats, at which he gave a talk entitled “Fisheries and Bycatch of Pelagic Megafauna.”

Dr. Hall participated in a meeting of the FAO Committee on Fisheries in Rome, Italy, on February 24-28, 2003. His travel expenses were paid by the World Wildlife Fund.

During the period of February 24-March 5, 2003, Dr. Robin Allen participated in a series of meetings in Rome, Italy, associated with the 25th session of the FAO Committee on Fisheries. The other events were a meeting on the establishment of the Fisheries Resources Monitoring System, a meeting of secretariats of the regional bodies responsible for tuna fisheries, and the third meeting of the Regional Fisheries Bodies, which he chaired.

Dr. Richard B. Deriso served as Chairman of a meeting of the Committee on Cooperative Research in the National Marine Fisheries Service of the National Research Council, held in St. Petersburg, Florida, on February 28-March 2, 2003. In addition, he participated in a meeting of the Ocean Studies Board of the National Research Council in Honolulu, Hawaii, on March 5-7. In both cases his travel expenses were paid by the National Research Council.

Dr. Martín A. Hall gave a seminar entitled "Bycatches in Eastern Pacific Tuna Fisheries: Conflicts, Priorities, and Challenges" at the Monterey Bay Aquarium, Monterey, California, on March 25, 2003. In addition, he gave a talk on the same subject at a meeting of the Orange County (California) chapter of the American Cetacean Society on March 27. Most of his travel expenses for the Monterey trip were paid by the Monterey Bay Aquarium.

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 and in La Jolla abstracted the logbook information for 262 trips of fishing vessels and collected 68 length-frequency samples during the first quarter of 2003.

Also, during the first quarter members of the field office staffs placed IATTC observers on 174 fishing trips by vessels that participate in the AIDCP On-Board Observer Program. In addition, 123 IATTC observers completed trips during the quarter, and were debriefed at the corresponding field offices.

Surface fleet and surface catch 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 200,546 cubic meters (m^3) (Table 1). The weekly average at-sea capacity for the fleet, for the weekly periods ending January 1 through March 30, was about 129,700 m^3 (range: 95,900 to 149,400 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 statistics

Catch statistics for the first quarter of 2003

The estimated total retained catches of tunas in the EPO during the report period, in metric tons, were:

Species	2003	1998-2002			Weekly average, 2003
		Average	Minimum	Maximum	
Yellowfin	113,000	91,000	57,000	122,000	9,000
Skipjack	50,000	53,000	29,000	80,000	4,000
Bigeye	5,000	11,000	8,000	19,000	<1,000

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

Catch statistics for 2002

Estimates of the annual retained and discarded catches of the various species of tunas and other fishes by vessels fishing at least part of the year in the EPO for yellowfin, skipjack, bigeye, or bluefin during 1970-2002 are shown in Table 4. This table includes only the catches by surface gear. The retained catch data for skipjack and bluefin are essentially complete except for insignificant catches made by the longline, recreational (for skipjack), and artisanal fisheries. The catch data for yellowfin and bigeye do not include catches by longline vessels, as the data from these fisheries are received much later than those for the surface fishery. About 5 to 10 percent of the total catch of yellowfin is taken by longlines. Until recently, the great majority of the catch of bigeye had been harvested by the longline fishery.

There were no restrictions on fishing for tunas in the EPO during 1980-1997. However, there were restrictions on fishing for yellowfin in the Commission's Yellowfin Regulatory Area (CYRA) (IATTC Annual Report for 2001: Figure 1) from November 26 through December 31, 1998, from October 14 through December 31, 1999, from December 1 through 31, 2000, and from October 27 through December 31, 2001. Fishing for tunas was prohibited in the EPO from December 1 through December 31, 2002. In addition, fishing for tunas associated with fish-aggregating devices (FADs) was prohibited in the EPO from November 9 through December 31, 1999, and from September 15 through December 15, 2000. Furthermore, regulations placed on purse-seine vessels directing their effort at tunas associated with dolphins have probably affected the way these vessels operate, especially during the late 1980s, the 1990s, and the early 2000s. There was a major El Niño event, which began in mid-1982 and persisted until late 1983. The catch rates in the EPO were low before and during the El Niño episode, which caused a shift of fishing effort from the eastern to the western Pacific, and the fishing effort remained relatively low during 1984-1986. During 1997-1998 another major El Nino event occurred in the EPO, and the effects of this on the vulnerability of the fish to capture are currently being studied.

The retained catches of yellowfin, skipjack, and bigeye in the EPO during 2002, the 1987-2001 annual averages for yellowfin and skipjack, and the 1994-2001 annual average for bigeye are as follows:

	2002	Average	Minimum	Maximum
			1987-2001	
Yellowfin	419,967	267,831	219,261	396,122
Skipjack	158,043	120,150	62,345	266,182
			1994-2001	
Bigeye	35,201	44,806	29,375	70,153

The 2002 catch of yellowfin exceeded the previous record catch of 396 thousand mt, recorded in 2001, and that of skipjack was above average, but considerably less than previous record of 266 thousand mt, recorded in 1999. The 2002 bigeye catch was less than the average for the 1994-2001 period.

The average annual distributions of the logged retained purse-seine catches of yellowfin, skipjack, and bigeye, by set type, in the EPO during the 1987-2001 period (1994-2001 for bigeye) are shown in Figures 1a, 2a, and 3a, and the preliminary estimates for 2002 are shown in Figures 1b, 2b, and 3b. The distributions of the catches of yellowfin and skipjack during 2002 were similar to those of 1987-2001, although some differences are evident.

Bigeye are not often caught by surface gear north of about 7°N. The distribution of the catch of bigeye during 2002 was similar to those of 1994-2001, although some differences are evident. With the development of the fishery for tunas associated with floating objects since 1994, the relative importance of the nearshore areas has decreased, while that of the offshore areas has increased.

While yellowfin, skipjack, and bigeye comprise most of the catches of fish made by tuna vessels in the EPO, bluefin, albacore, bonito, black skipjack, and other species contribute to the overall harvest in this area. The total retained catch of these other species in the EPO was about 4 thousand mt in 2002, which is well below the 1987-2001 average of 8 thousand mt (range: 2 to 17 thousand).

The estimated retained catch of all species in the EPO in 2002 was about 616 thousand mt, which is 46 percent greater than the average of 421 thousand mt for 1987-2001, and 1 percent greater than the previous record total catch of 608 thousand mt, taken in 1999.

Preliminary estimates of the retained catches in the EPO, by flag, and the landings of EPO-caught fish, by country, are given in Table 5. The landings are fish unloaded during a calendar year, regardless of the year of catch. The country of landing is that in which the fish were unloaded from the fishing vessel or, in the case of transshipments, the country which received the transshipped fish.

Preliminary estimates of the most significant (equal to or greater than 5 percent of the total) retained catches and landings, of all species combined, during 2002 were as follows:

Flag	Catches		Landings	
	Metric tons	Percentage	Metric tons	Percentage
Colombia	33,000	5	33,000	5
Costa Rica	-	-	39,000	6
Ecuador	135,000	22	259,000	41
Spain	32,000	5	-	-
Mexico	163,000	26	160,000	25
Panama	29,000	5	-	-
Venezuela	124,000	20	30,000	5

It is important to note that when final information is available the landings currently assigned to the various countries may change due to exports from storage facilities to processors in other nations.

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 4).

Data for fish caught during the fourth quarter of 1997-2002 are presented in this report. (Because the average length of a fishing trip is about two months and it takes time to collect and process the samples, the data in this report are for fish caught during the fourth quarter of 2002.) Two length-frequency histograms are presented for yellowfin, skipjack, and bigeye. The first shows the data by fishery (area, gear type, and set type) for the fourth quarter of 2002, and the second shows the fourth-quarter catches for 2002 and the previous five years. There were 182 wells sampled during the fourth quarter of 2002.

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 4). The last fishery includes all 13 sampling areas. Of the 182 wells sampled, 175 contained yellowfin. The estimated size compositions of these fish are shown in Figure 5a. The catches of yellowfin during the fourth quarter of 2002 remained high in dolphin sets in the North and Inshore areas, where large fish were encountered. The catch of yellowfin taken in dolphin sets in the South was low, but the largest fish (average weight of 45.7 kg) were encountered in this area. Negligible amounts of yellowfin (less than 1000 mt) were taken by pole-and-line vessels, and 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, especially in the Equatorial and Inshore areas.

The estimated size compositions of the yellowfin caught by all fisheries combined during the fourth quarter of 1997-2002 are shown in Figure 5b. 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 fourth quarter of 2002, 12.9 kg, was similar to those of the fourth quarters of the previous three years.

There are eight fisheries for skipjack defined for stock assessments: four floating-object, two unassociated school, one dolphin, and one pole-and-line (Figure 4). The last two fisheries include all 13 sampling areas. Of the 182 wells sampled, 88 contained skipjack. The estimated size compositions of these fish are shown in Figure 6a. The distinct modes of fish between about 30 and 50 cm have persisted in the major fishing areas throughout 2002, especially in the floating-object fisheries of the North and South. In addition, a mode of larger fish between 60 to 75 cm was prevalent in some fisheries, particularly in the Equatorial area during the second half of 2002, causing the catches in this area to be three times that of any other skipjack fishery. Negligible amounts of skipjack (less than 1000 mt) were taken in dolphin sets and by pole-and-line vessels.

The estimated size compositions of the skipjack caught by all fisheries combined during the fourth quarter of 1997-2002 are shown in Figure 6b. The average weight, 2.6 kg, is less than those for the fourth quarters of the previous three years The two modes mentioned above are apparent in the data for the fourth quarter of 2002.

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 4). The last three fisheries include all 13 sampling areas. Of the 182 wells sampled, 36 contained bigeye. The estimated size compositions of these fish are shown in Figure 7a. In contrast to the first half of 2002, when most of the bigeye were caught in the floating-object fishery of the South, during the second half of 2002, most of the fish were caught in the floating-object fisheries of the North and Equatorial areas. Two distinct modes were apparent during the first three quarters of 2002, one between 40 and 55 cm and the other between 125 and 150 cm. The mode of smaller fish was still present during the fourth quarter, but widened to include fish up to about 75 cm. The mode of larger fish was no longer present during the fourth quarter. However, another mode of fish greater than about 90 cm became evident during the second half of 2002. There were no recorded catches of bigeye in dolphin sets or by pole-and-line vessels and negligible amounts (less than 200 mt) were taken in the unassociated fishery and in floating-object sets in the Inshore area.

The estimated size compositions of the bigeye caught by all fisheries combined during the fourth quarter of 1997-2002 are shown in Figure 7b. The average weight of bigeye caught decreased from 8.3 kg during the first quarter to 5.3 kg during the fourth quarter. Most of the bigeye caught during the fourth quarter of 2002 were less than about 75 cm long.

The estimated retained catch of bigeye less than 60 cm in length during 2002 was 10,513 metric tons (mt), or about 30 percent of the estimated total catch of bigeye. The corresponding amounts for 1997-2001 ranged from 3,454 to 19,623. mt.

Pacific bluefin are caught by surface gear by both commercial and sport-fishing vessels off California and Baja California from about 23°N to 35°N, with most of the catch being taken during May through October. During 2002 bluefin were caught between 25°N and 37°N from May through October. The majority of the catch of bluefin by commercial vessels was taken during July, September, and October, and .most of the catches by sport-fishing vessels were taken in August. In the past, commercial and recreational catches have been reported separately. In 2002, however, 45 samples were taken from recreational vessels and only one from a com-

mercial vessel, making it infeasible to estimate the catches and size compositions separately. Therefore, the commercial and recreational catches of bluefin were combined for the 1997-2002 period. The estimated size compositions are shown in Figure 8. The 1 sample of commercially-caught fish was given much greater weight than the combined 44 samples of fish caught by recreational fishermen because the commercial catch far exceeded the recreational catch. (The same applies to 2001, for which there were 3 and 95 samples, respectively, from the commercial and recreational fisheries.)

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 information relevant to compliance with the provisions of the AIDCP, and data required for the certification of the "dolphin-safe" status of tuna caught.

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 and the FFA departed on 257 fishing trips aboard purse seiners covered by the On-Board Observer Program during the first quarter of 2003. Preliminary coverage data for these vessels during the quarter are shown in Table 6.

Training

There were no IATTC observer training courses held during the first quarter of 2003.

RESEARCH

Tuna tagging

During January 2002 archival tags were implanted into the body cavities of 12 yellowfin, and these fish were placed into Tank 2 at the Achotines Laboratory. At the end of November 2002 three of these fish were moved to Tank 1 in anticipation that they would spawn and provide data recorded in their archival tags on internal temperature variability associated with spawning. These fish remained in Tank 1 during the first quarter, and appeared to be participating in spawning activity.

A second trial with archival-tagged yellowfin was initiated at the end of January 2003. A total of 17 archival tags, 5 from Wildlife Computers (model Mk9) and 12 from Lotek Wireless, Inc. (model LTD2410), were implanted in captive fish 52 to 63 cm in length that were placed in Tank 2 (170,000 L). At the end of March there were 14 fish remaining in the tank. One of these is known to have shed its tag, which was recovered from the bottom of the tank.

Another cruise to tag bigeye tuna in the equatorial eastern Pacific Ocean was initiated during the quarter. The chartered baitboat *Her Grace*, with two IATTC employees and one graduate student at Scripps Institution of Oceanography aboard, left San Diego for Panama on March 1, 2003. It caught about 1,000 scoops of anchovetas for use as bait in the Gulf of Panama, and then proceeded to the fishing grounds west of the Galapagos Islands. As of March 31, 160 bigeye, 120 yellowfin, and 21 skipjack had been tagged. Archival tags were put on 21 of the bigeye.

A bluefin tuna with an archival tag was found in one of the holding pens near Salsipuedes, Mexico, on February 10, 2003. The fish was released by the National Research Institute of Far Seas Fisheries of Japan at 36°07'N-140°49'E on November 30, 2000, at which time it was 43 cm long. The IATTC staff is still trying to obtain the most likely location and date of recapture of this fish. (When the Japanese scientists have examined the tag they will be able to determine the approximate location of the fish each day, including the date that it was recaptured. The location of a set made on that date, by the boat that is believed to have caught the fish, that is closest to the approximate location of recapture recorded by the tag will be assumed to be the location of recapture.)

Early life history studies

Yellowfin broodstock

The yellowfin broodstock in Tank 1 (1,362,000 L) at the Achotines Laboratory spawned daily through January 27, at which time spawning ceased due to declining water temperatures. Spawning resumed on February 8, and continued on a daily basis through March. Spawning occurred as early as 2:00 p.m. and as late as 10:00 p.m. The water temperatures in the tank ranged from 24.4° to 28.9°C during the quarter. The numbers of eggs collected after each spawning event ranged from about 7,000 to 556,000.

During the quarter three fish died, including one 33-kg female of unknown causes, one 38-kg female from a wall strike, and one 45-kg male from infection and/or starvation. At the end of March there were three size groups of fish in Tank 1, including four 85- to 95-kg fish, four 37- to 43-kg fish, and four 19- to 32-kg fish.

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 snapper broodstock established in 1996 continued to spawn intermittently. There were several unexplained mortalities in this population during that period, leaving a total of 32 fish at the end of the quarter. 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 floating pens in an estuarine mangrove area about 12 km from Achotines Laboratory for growth studies. This project is funded by a grant from Proyectos de Pobreza Rural of the Autoridad Nacional del Ambiente of Panama.

Twenty-nine snappers, averaging 1.4 kg, that were raised in two 3.7-meter diameter tanks at the Achotines Laboratory from eggs to mature adults, were moved to a concrete tank (Tank 4). These fish had hatched in October 1998 from eggs obtained from the original snapper broodstock, which 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 the study, a sportfishing boat, the *Warrior*, and its owner, Mike Foster, assisted with efforts in February to capture and maintain live sailfish at the Achotines Laboratory, but these efforts were unsuccessful.

Mr. Michael Joseph, who has considerable experience in the commercial capture, transport, and culture of pen-raised tuna, made several visits to the Achotines Laboratory during the quarter to supervise the construction of a towable pen to be used to transfer sailfish, tunas, and other pelagic fishes to the Laboratory. The pen was completed and successfully tested in late February, with the assistance of the long-range sport-fishing vessel *Royal Star*. The owner of that vessel, Capt. Tim Ekstrom, his crew, and Mr. Joseph worked with the Achotines staff, de-

ploying, testing, and recovering the pen. Both the *Royal Star* and the Achotines Laboratory skiff, *Kihada Maru*, fished for sailfish and yellowfin tuna for several days in late February but no live fish of either species were captured. Efforts to catch and transport live sailfish to the Achotines Laboratory will continue during 2003.

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 SOI* and the NOI*, have recently been devised. These are described in the IATTC Quarterly Report for January-March 2001. The SOI* and NOI* values are both negative during El Niño events and positive during anti-El Niño events.

During the fourth quarter of 2002 there was a band of warm water extending from about 180° (175°E in November) to about 90°W (85°W in December) (IATTC Quarterly Report for October-December 2002: Figure 7). The extent of this area of warm water was much decreased during the first quarter of 2003. Also two small areas of cool water appeared south of the equator between the coast of Ecuador and about 115°W in March (Figure 9). The data in Table 7, for the most part, indicate that conditions were close to normal during the first quarter of 2003. However, the thermocline was quite shallow along the equator from the coast of Ecuador to about 110°W during February and March. According to the Climate Diagnostics Bulletin of the U.S. National Weather Service for March 2003, "Consistent with current conditions and recent observed trends, a majority of the … forecasts indicate that near-normal conditions will prevail through September 2003 …. However, there is uncertainty in this forecast, as some forecasts indicate the possibility of continued weak El Niño conditions … while others indicate the development of [anti-El Niño] conditions during the second half of 2003."

GEAR PROGRAM

During the first quarter IATTC staff members participated in dolphin safety-gear inspection and safety-panel alignment procedures aboard 10 purse seiners, 7 registered in Mexico and 1 each in Bolivia, Ecuador, and El Salvador.

One AIDCP seminar for fishing captains was conducted during the quarter by the staff of the Venezuelan national observer program (PNOV) in Manta, Ecuador, on March 31, 2003. Fifteen fishermen and other industry personnel attended the seminar.

PUBLICATIONS

IATTC Stock Assessment Report 3 (Printed copies of this report are not available, but copies of the seven papers that are in it are available on the IATTC's web site, www.iattc.org. Except for the pagination, the papers on the web site are identical to those in Stock Assessment Report 3.)

Outside journals

Maunder, Mark N. 2003. Is it time to discard the Schaefer model from the stock assessment scientist's toolbox? Fish. Res., 61 (1-3): 145-149.

Maunder, Mark N., and George W. Watters. 2003. A general framework for integrating environmental time series into stock assessment models: model description, simulation testing, and example. U.S. Nat. Mar. Fish. Serv., Fish. Bull., 101 (1): 89-99.

Niwa, Yukiyasi, Akio Nakazawa, Daniel Margulies, Vernon P. Scholey, Jeanne B. Wexler, and Seinen Chow. 2003. Genetic monitoring for spawning ecology of captive yellowfin tuna (*Thunnus albacares*) using mitochondrial DNA variation. Aquaculture, 218 (1-4): 387-395.

Scholey, Vernon, Daniel Margulies, Jeanne Wexler, and Sharon Hunt. 2003. Panamanian lab hosts research on tuna, other marine species. Global Aqua. Advocate, 6 (1): 75-76.

Wexler, Jeanne B., Vernon P. Scholey, Robert J. Olson, Daniel Margulies, Akio Nakazawa, and Jenny M. Suter. 2003. Tank culture of yellowfin tuna, *Thunnus albacares*: developing a spawning population for research purposes. Aquaculture, 220 (1-4): 327-353.

ADMINISTRATION

Ms. Amy French, a graduate of the University of Arizona, was employed temporarily on January 14, , to help Ms. Jenny Suter with some aspects of the IATTC's length-frequency data base.

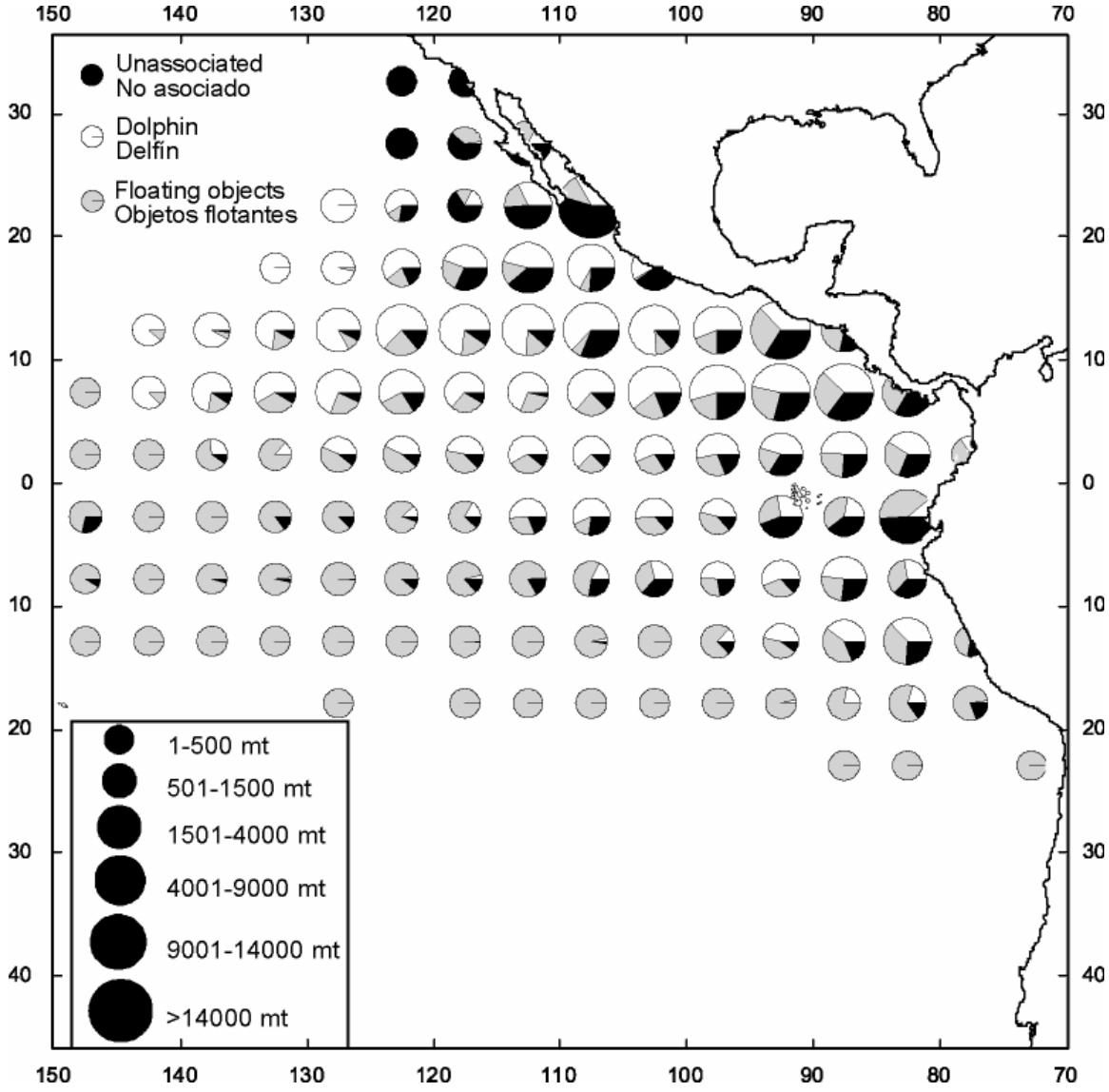

FIGURE 1a. Average annual distribution of the logged retained catches of yellowfin in the eastern Pacific Ocean during 1987-2001.
FIGURA 1a. Distribución anual media de las capturas retenidas registradas de aleta amarilla en el Océano Pacífico oriental durante 1987-2001.

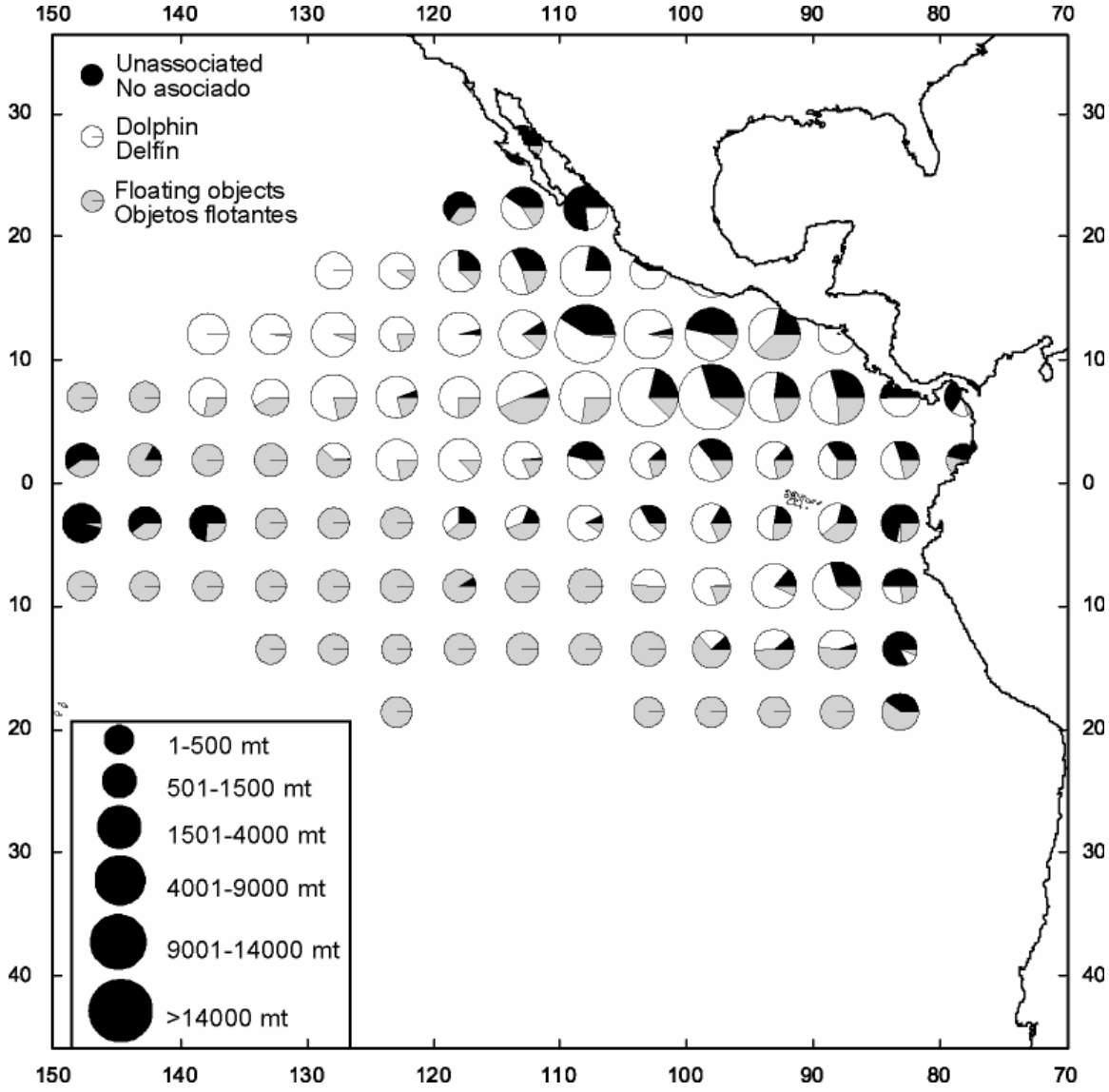

FIGURE 1b. Distribution of the logged retained catches of yellowfin in the eastern Pacific Ocean during 2002.
FIGURA 1b. Distribución de las capturas retenidas registradas de aleta amarilla en el Océano Pacífico oriental durante 2002.

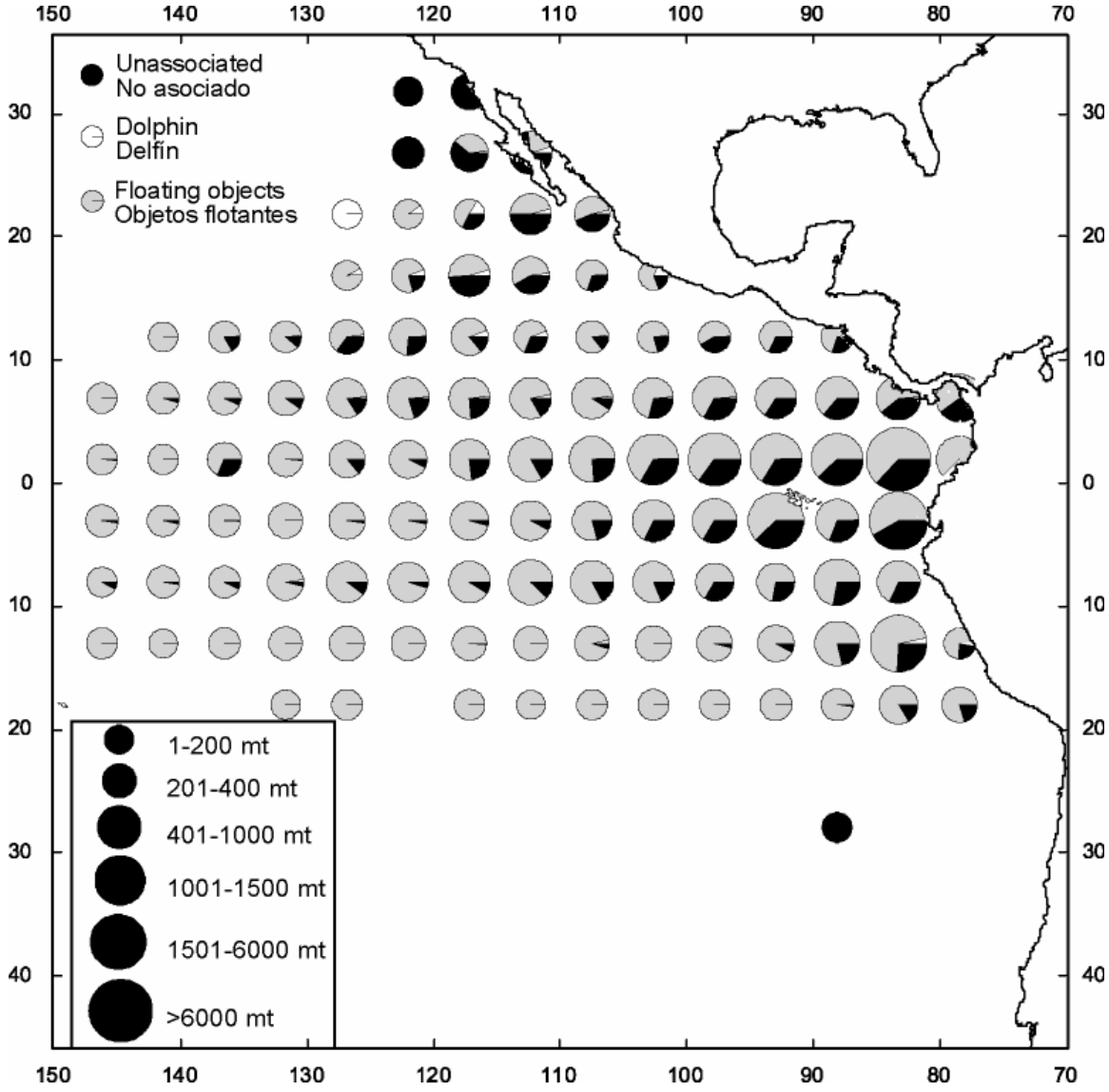

FIGURE 2a. Average annual distribution of the logged retained catches of skipjack in the eastern Pacific Ocean during 1987-2001.
FIGURA 2a. Distribución anual media de las capturas retenidas registradas de barrilete en el Océano Pacífico oriental durante 1987-2001.

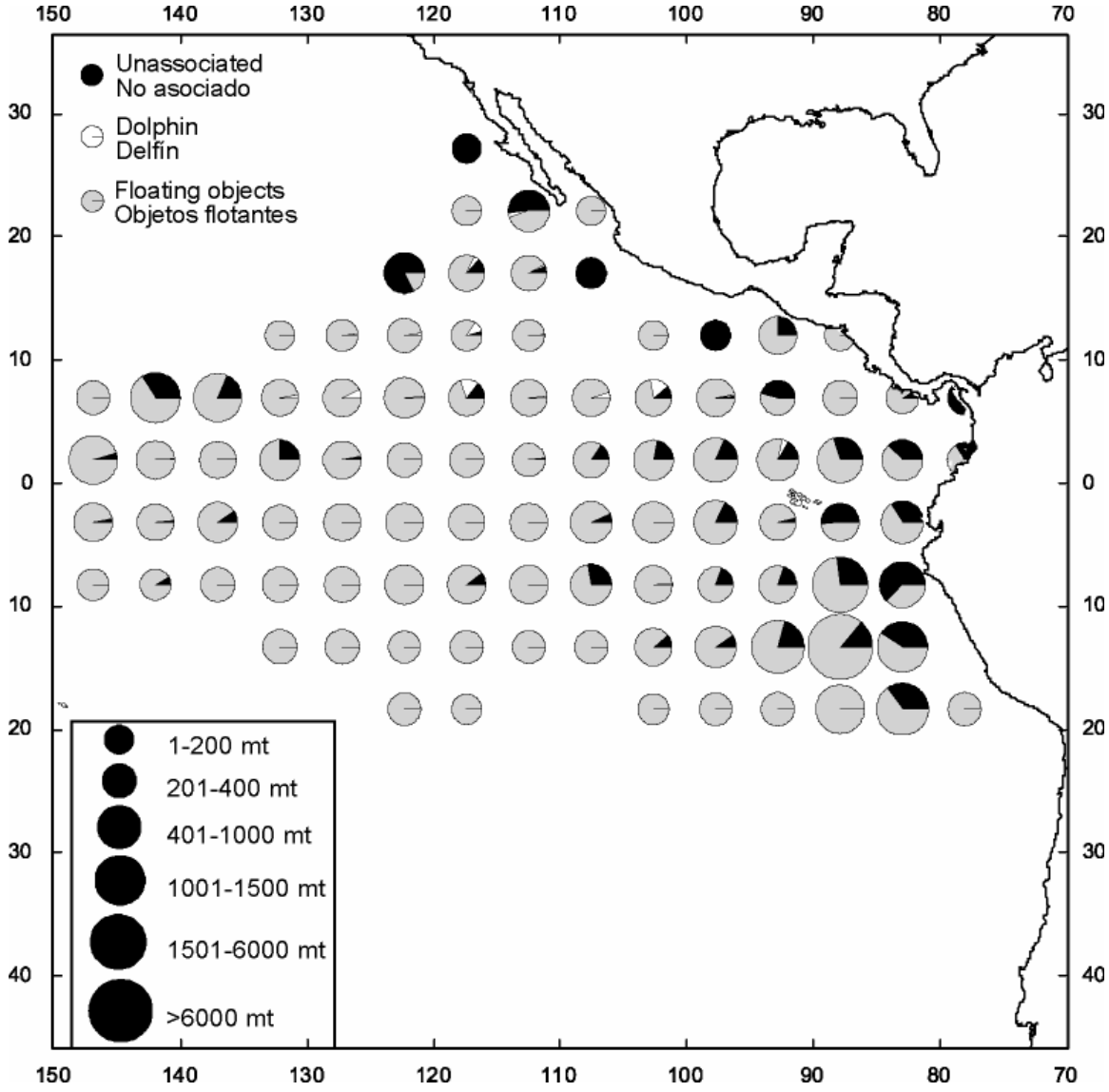

FIGURE 2b. Distribution of the logged retained catches of skipjack in the eastern Pacific Ocean during 2002.

FIGURA 2b. Distribución de las capturas retenidas registradas de barrilete en el Océano Pacífico oriental durante 2002.

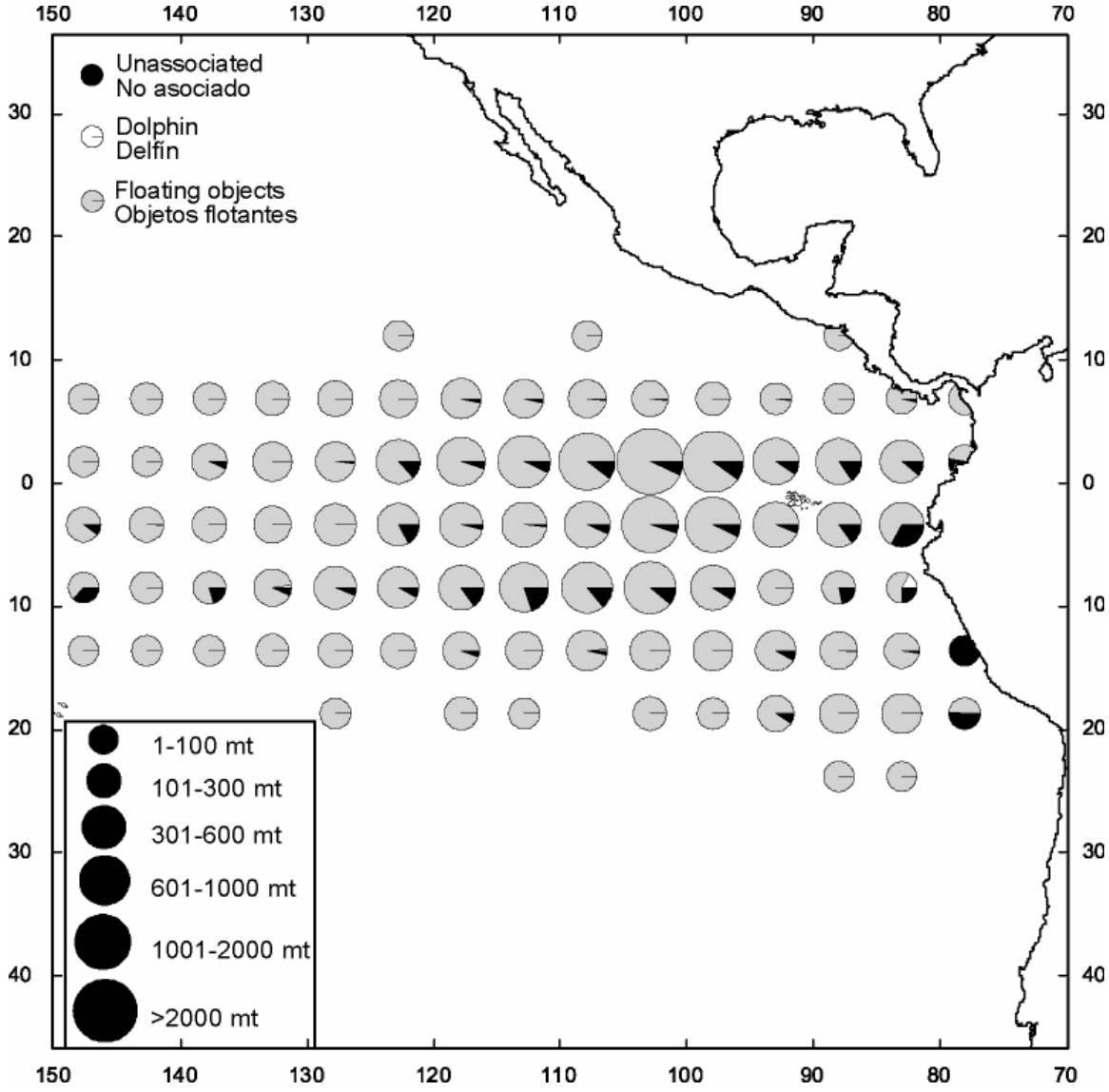

FIGURE 3a. Average annual distribution of the logged retained catches of bigeye in the eastern Pacific Ocean during 1994-2001.
FIGURA 3a. Distribución anual promedia de las capturas retenidas registradas de patudo en el Océano Pacífico oriental durante 1994-2001.

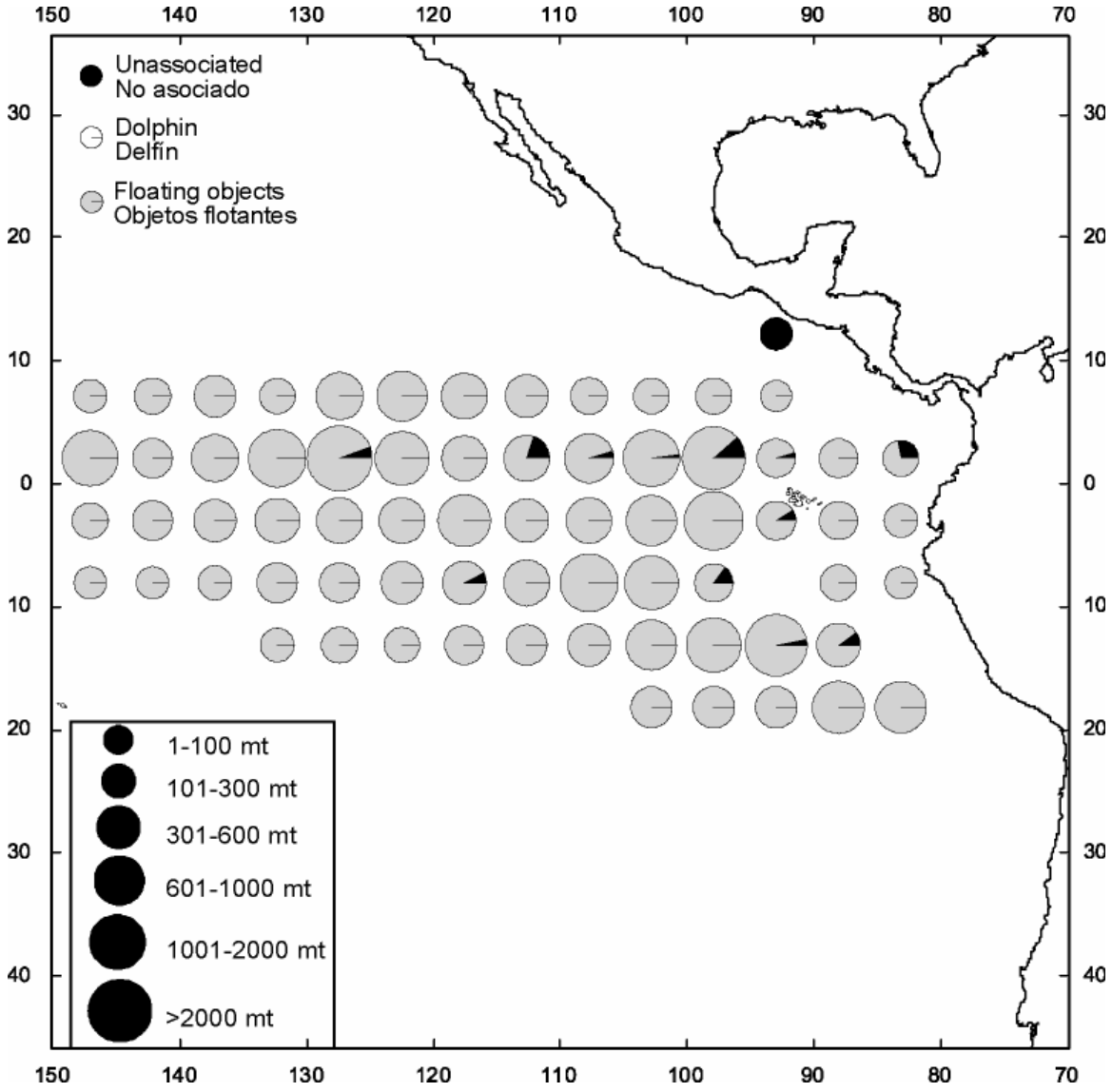

FIGURE 3b. Distribution of the logged retained catches of bigeye in the eastern Pacific Ocean during 2002.
FIGURA 3b. Distribución de las capturas retenidas registradas de patudo en el Océano Pacífico oriental durante 2002.

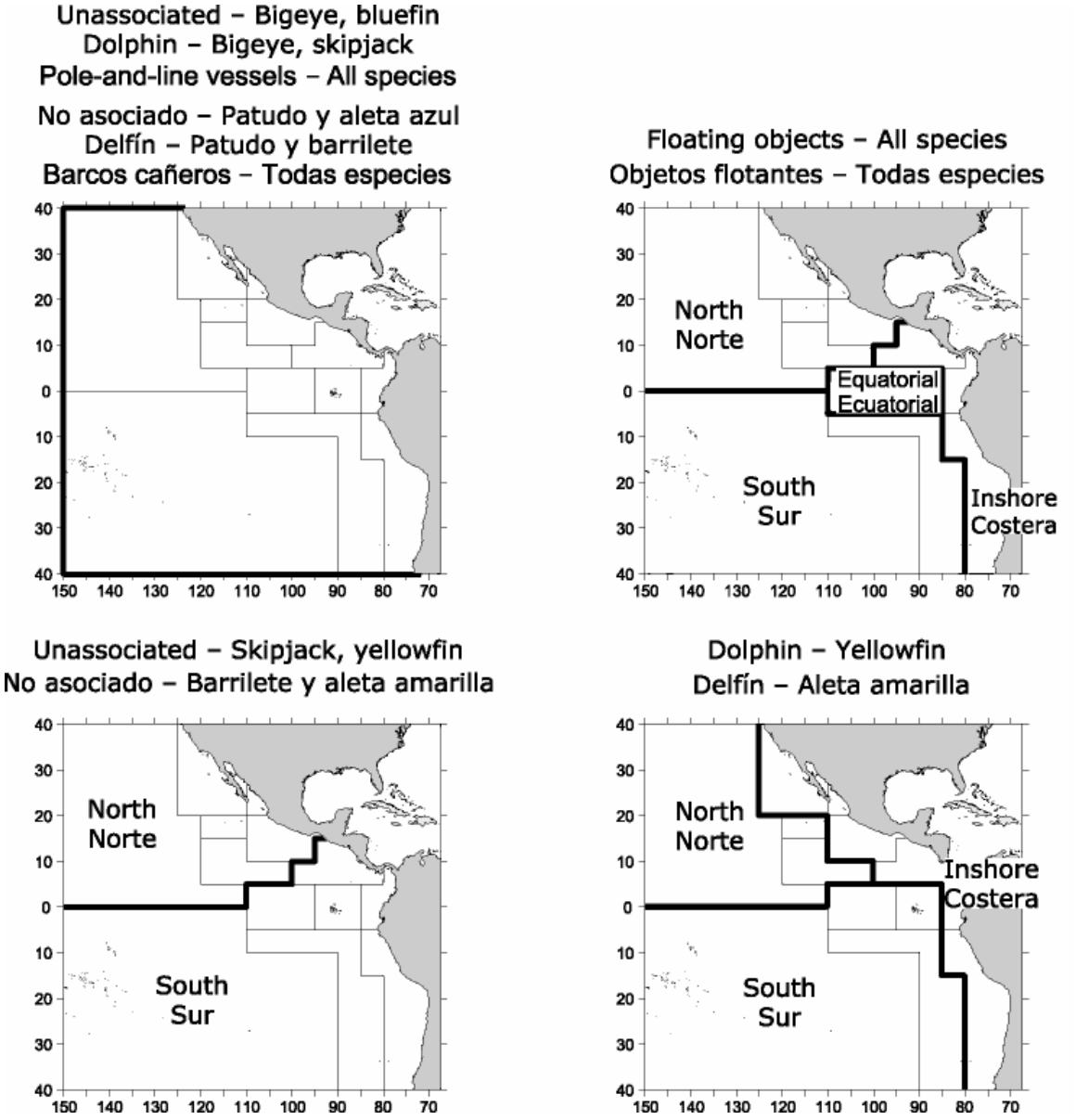

FIGURE 4. Spatial extents of the fisheries defined by the IATTC staff for stock assessment of yellowfin, skipjack, and bigeye in the EPO. The thin lines indicate the boundaries of the 13 length-frequency sampling areas, and the bold lines the boundaries of the fisheries.
FIGURA 4. Extensión especial 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 zonasde muestreo de frecuencia de tallas, y las líneas gruesas los límites de las pesquerías.

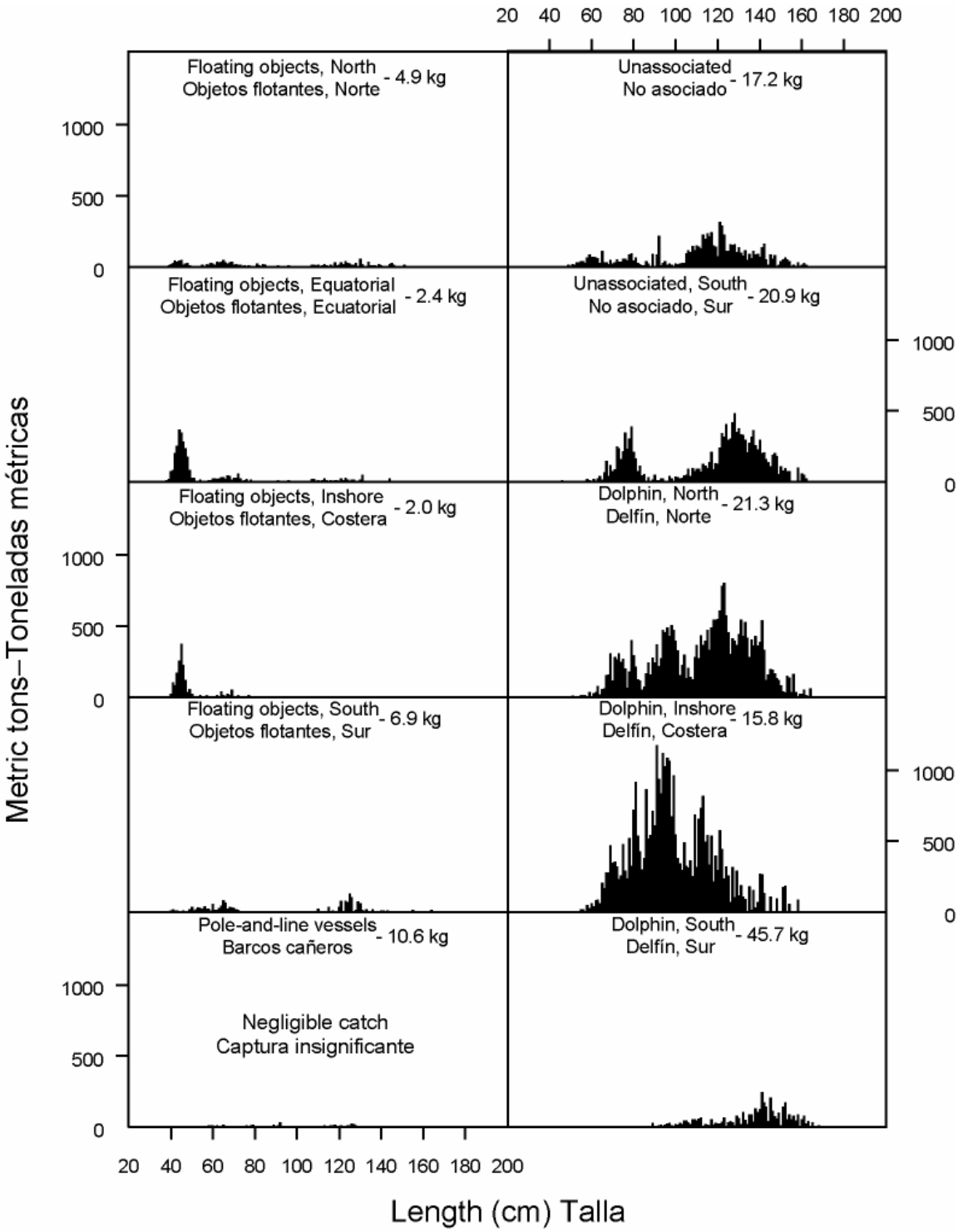

FIGURE 5a. Estimated size compositions of the yellowfin caught in each fishery of the EPO during the fourth quarter of 2002. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 5a. Composición por tallas estimada para el aleta amarilla capturado en cada pesquería del OPO durante el cuarto trimestre de 2002. En cada recuadro se detalla el peso promedio de los peces en las muestras.

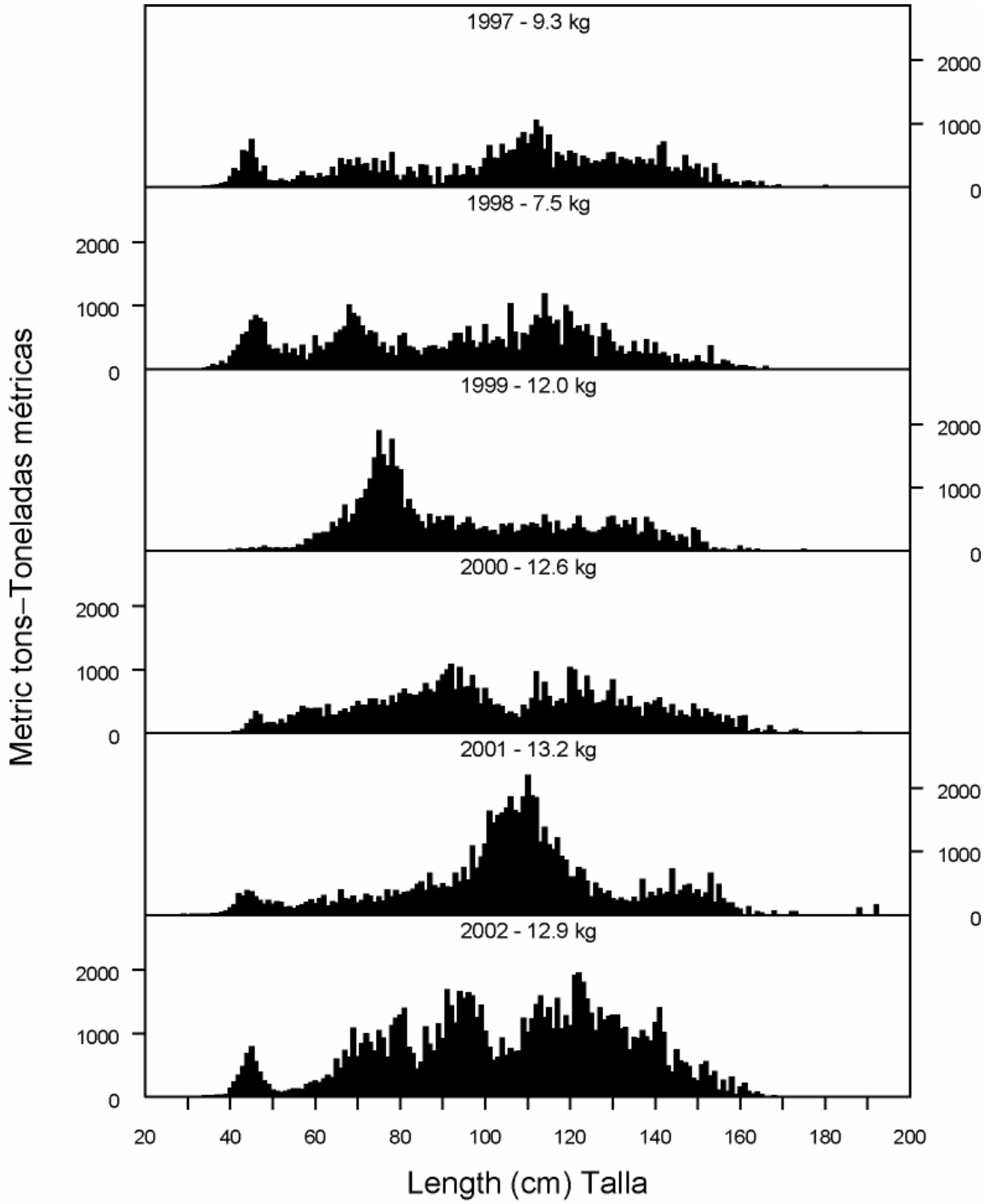

FIGURE 5b. Estimated size compositions of the yellowfin caught in the EPO during the fourth quarter of 1997-2002. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 5b. Composición por tallas estimada para el aleta amarilla capturado en el OPO en el cuarto trimestre de 1997-2002. En cada recuadro se detalla el peso promedio de los peces en las muestras.

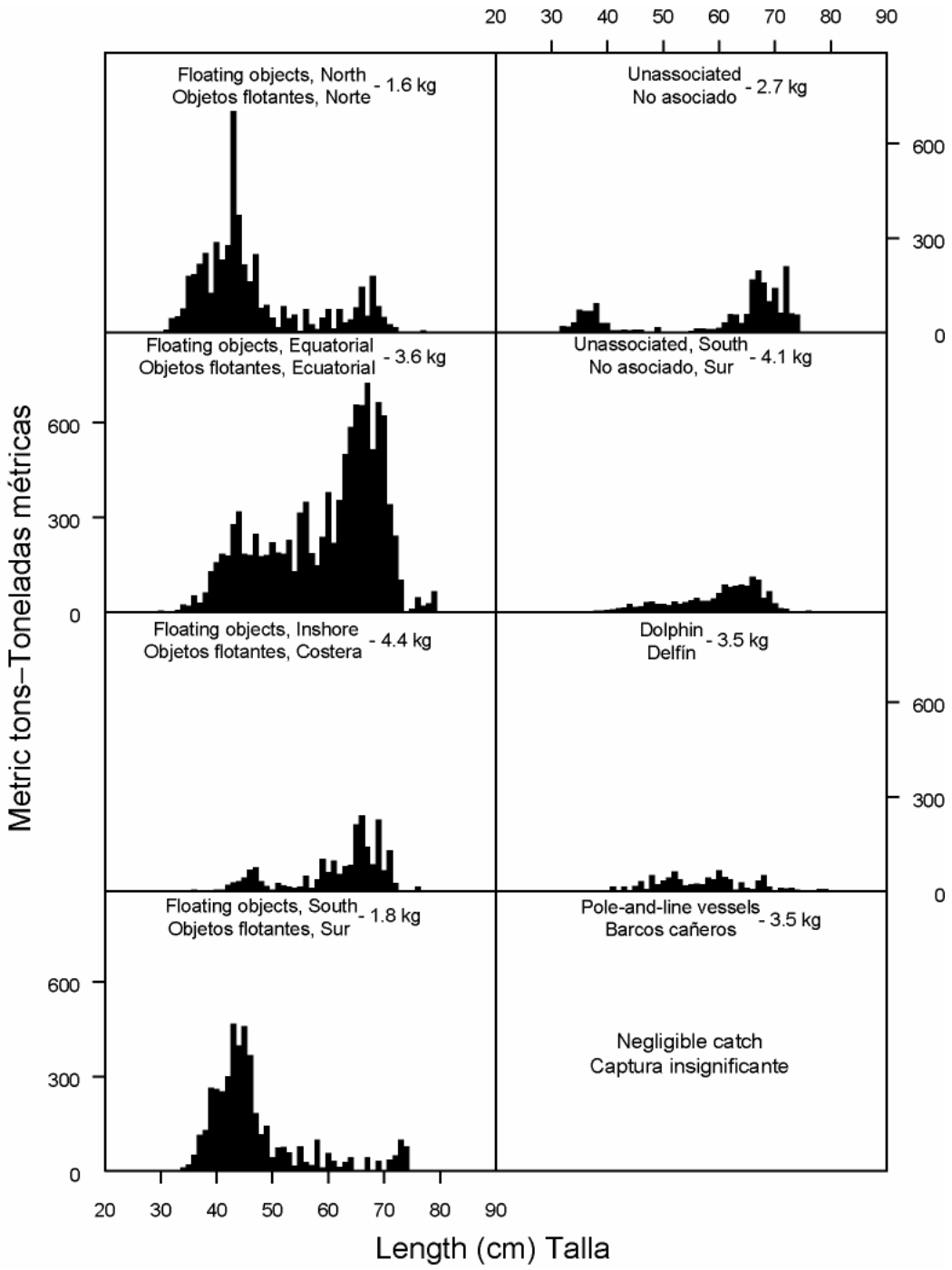

FIGURE 6a. Estimated size compositions of the skipjack caught in each fishery of the EPO during the fourth quarter of 2002. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 6a. Composición por tallas estimada para el barrilete capturado en cada pesquería del OPO durante el cuarto trimestre de 2002. En cada recuadro se detalla el peso promedio de los peces en las muestras.

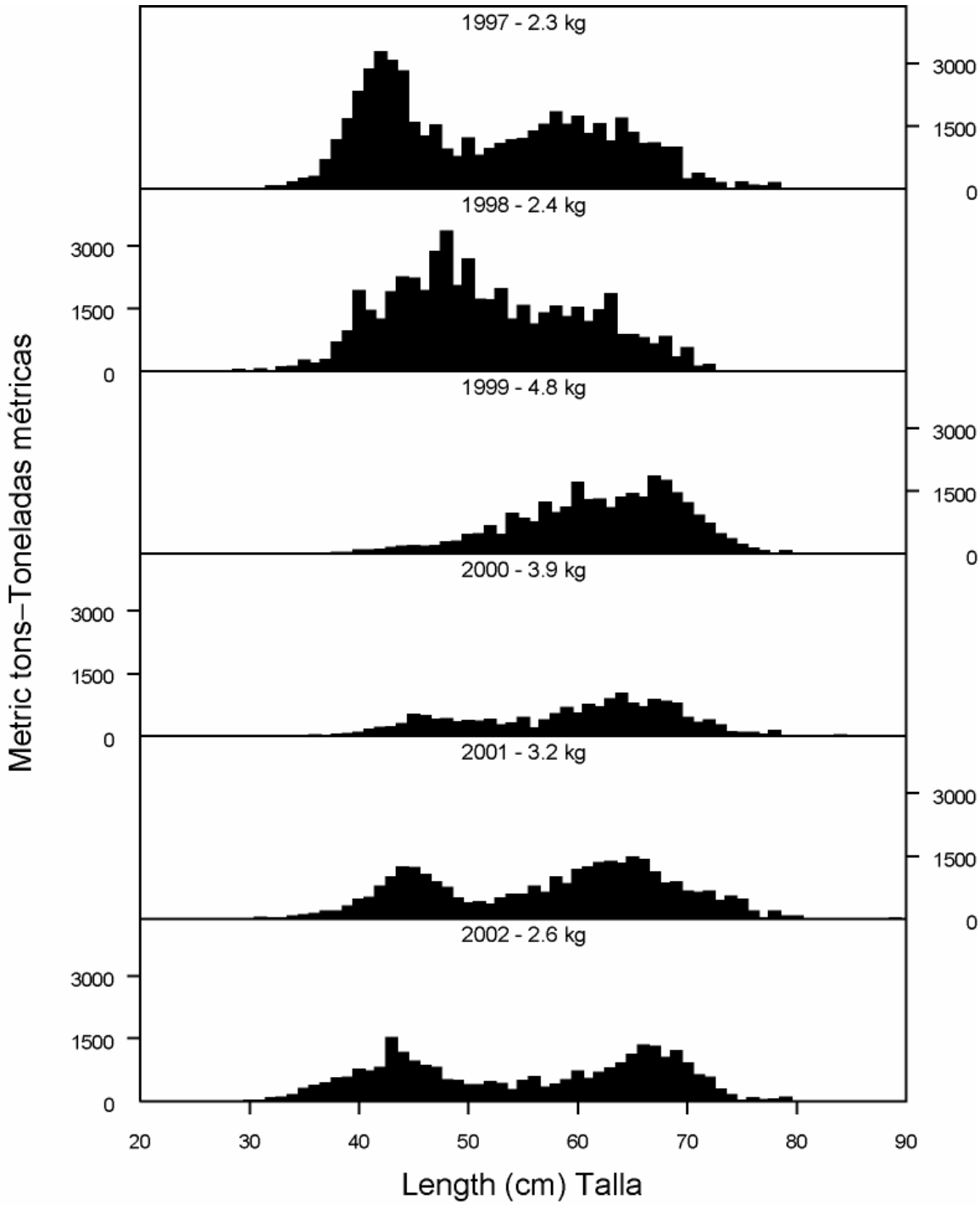

FIGURE 6b. Estimated size compositions of the skipjack caught in the EPO during the fourth quarter of 1997-2002. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 6b. Composición por tallas estimada para el barrilete capturado en el OPO en el cuarto trimestre de 1997-2002. En cada recuadro se detalla el peso promedio de los peces en las muestras.

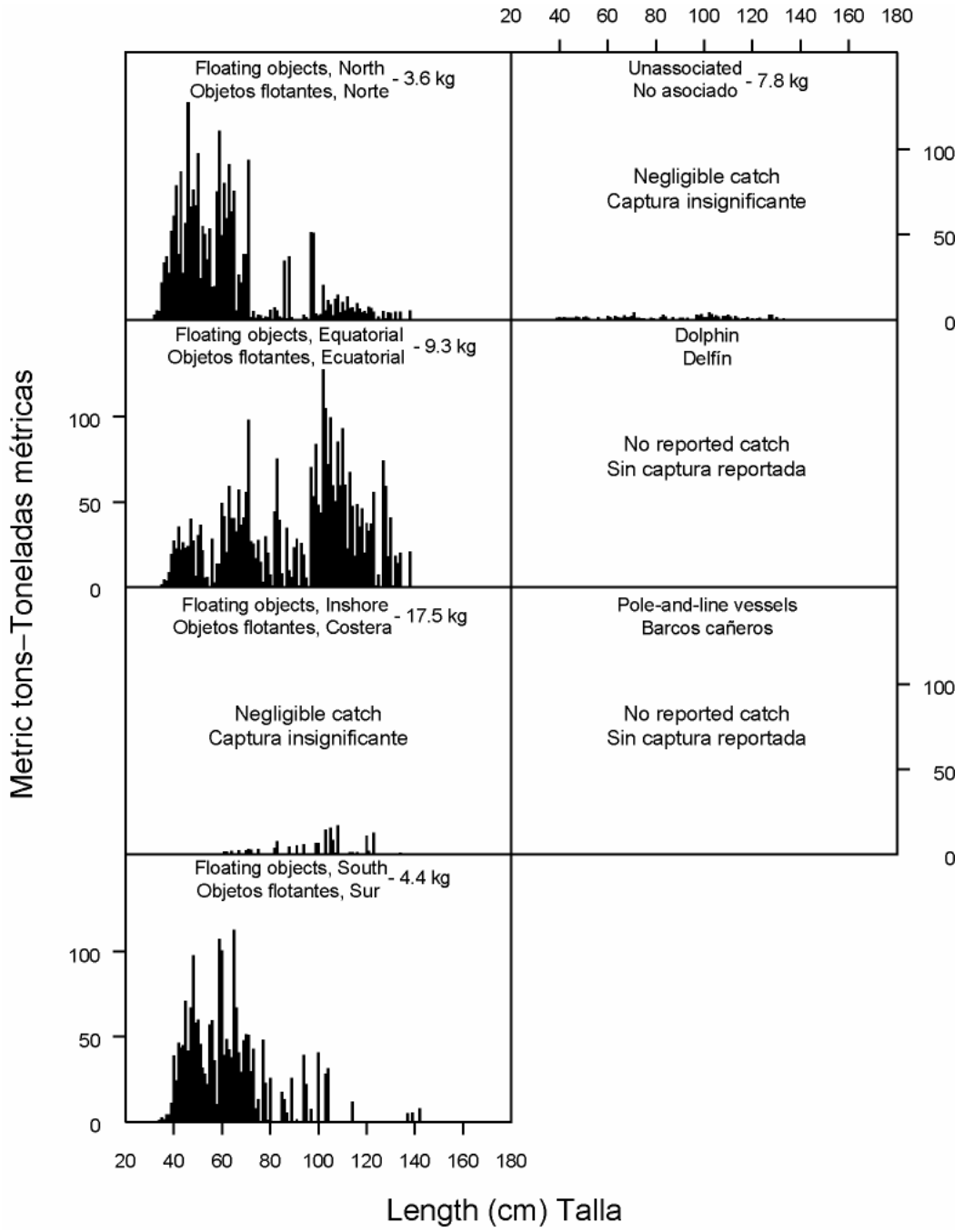

FIGURE 7a. Estimated size compositions of the bigeye caught in each fishery of the EPO during the fourth quarter of 2002. The average weights of the fish in the samples are given at the tops of the panels.
FIGURA 7a. Composición por tallas estimada para el patudo capturado en cada pesquería del OPO durante el cuarto trimestre de 2002. En cada recuadro se detalla el peso promedio de los peces en las muestras.

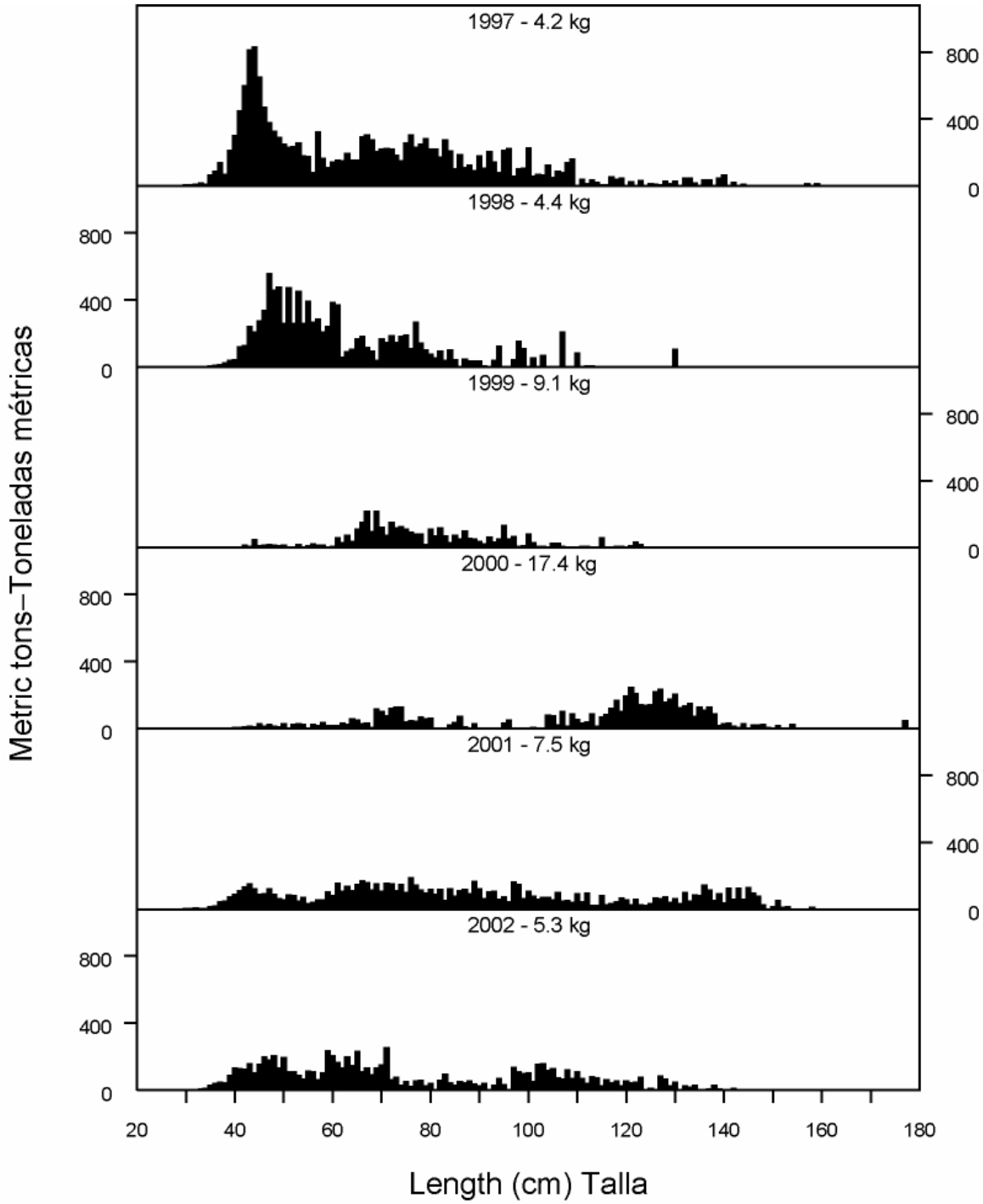

FIGURE 7b. Estimated size compositions of the bigeye caught in the EPO during the fourth quarter of 1997-2002. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 7b. Composición por tallas estimada para el patudo capturado en el OPO en el cuarto trimestre de 1997-2002. En cada recuadro se detalla el peso promedio de los peces en las muestras.

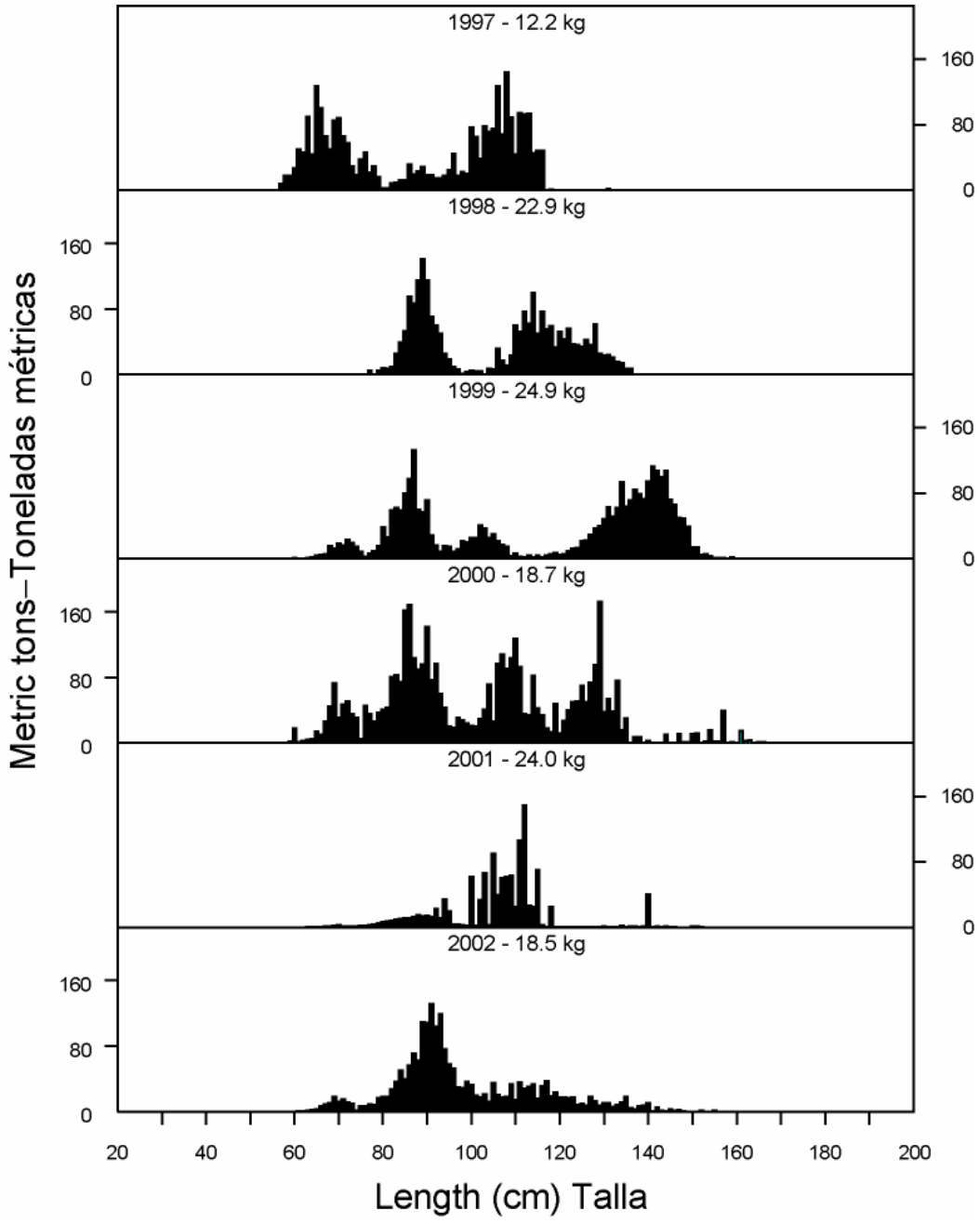

FIGURE 8. Estimated size compositions of the bluefin caught in the commercial and recreational fisheries of the EPO during 1997-2002. The average weights of the fish in the samples are given at the tops of the panels.
FIGURA 8. Composición por tallas estimada para el aleta azul capturado en las pesquerías comerciales y deportivas del OPO durante 1997-2002. En cada recuadro se detalla el peso promedio de los peces en las muestras.

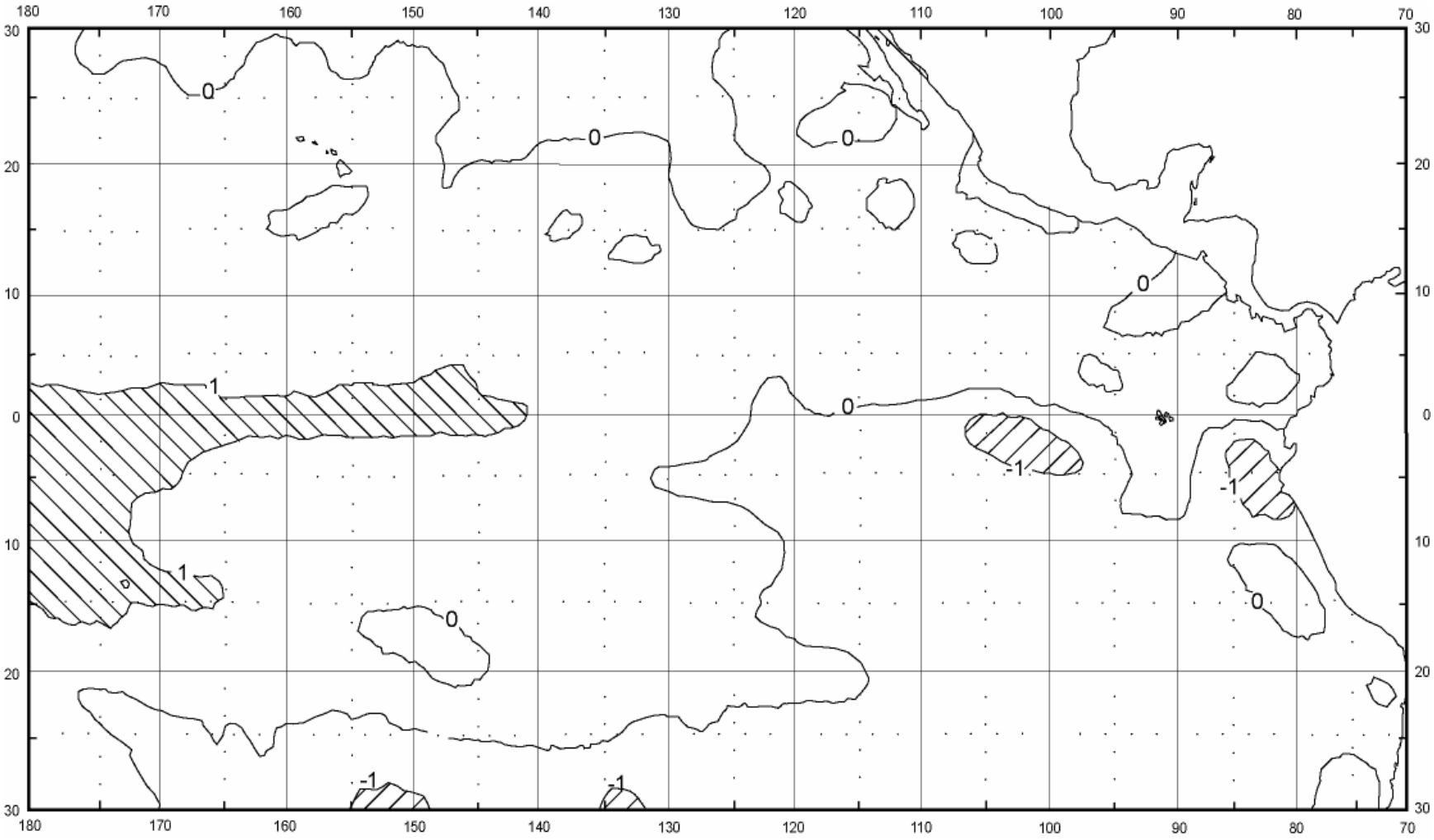

FIGURE 9. Sea-surface temperature (SST) anomalies (departures from long-term normals) for March 2003, based on data from fishing boats and other types of commercial vessels.
FIGURA 9. Anomalías (variaciones de los niveles normales a largo plazo) de la temperatura superficial del mar (TSM) en marzo de 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 baitboats 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 vessel.

TABLA 1. Estimaciones preliminares del número de buques que pescaron en el OPO en 2003 (sin incluir palangreros y buques pequeños diversos), 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 = barco cañero.

Flag Bandera	Gear Arte	Size class—Clase de arqueo							Capacity Capacidad
		1	2	3	4	5	6	Total	
					Number—Número				
Belize—Belice	PS	-	-	1	-	-	1	2	1,018
Bolivia	PS	-	-	2	1	-	7	10	7,910
Colombia	PS	-	-	1	1	2	5	9	7,259
Ecuador	PS	-	7	10	12	8	37	74	47,028
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	50,918
	LP	1	-	5	-	-	-	6	798
Panamá	PS	-	-	-	2	-	7	9	10,931
Perú	PS	-	-	-	-	-	2	2	2,018
El Salvador	PS	-	-	-	-	-	3	3	5,686
U.S.A.—EE.UU.	PS	-	-	2	-	-	5	7	6,680
Venezuela	PS	-	-	-	-	-	26	26	33,588
Vanuatu	PS	-	-	-	-	-	5	5	5,906
All flags—	PS	-	7	21	20	21	146	215	
Todas banderas	LP	1	-	5	-	-	-	6	
	PS + LP	1	7	26	20	21	146	221	
					Capacity—Capacidad				
All flags—	PS	-	758	3,853	5,622	8,830	180,685	199,748	
Todas banderas	LP	53	-	745	-	-	-	798	
	PS + LP	53	758	4,598	5,622	8,830	180,685	200,546	

TABLE 2. Changes in the list of vessels active in the surface fishery for tunas in the EPO recorded during the first quarter of 2003. PS = purse seine; LP = pole-and-line vessel.
TABLA 2. Cambios en la lista de buque actives en la pesquería atunera de superficie en el OPO registrados durante el primer 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					
New entries—Nuevos ingresos:					
Cesar V	Ecuador	PS	335		
Ugavi Dos	Vanuatu	PS	1,882		
Re-entries—Reingresos:					
				Now—Ahora	
Erasmo F	Ecuador	PS	662	*Rodolfo X*	
Sabrina	Ecuador	PS	996	*Milena*	Perú
Akalan II	México	PS	1,311	*Monica*	
Theresa Janene	México	PS	1,275		
Cape Mendocino	USA—EE.UU.	PS	1,573	*Cuyuni*	Venezuela
Judibana	Venezuela	PS	1,231		
Changes of flag—Cambios de pabellón					
Atun IV	Belize	PS	809		Ecuador
Vessels removed from the fleet—Buques retirados de la flota					
Maria Fatima	Ecuador	PS	338		
Rosa Isabel	Ecuador	LP	32		
Sajambre	Ecuador	PS	694		
Atun VII	México	PS	751		
Erika	México	LP	94		
Gabiero	México	PS	1,118		
Macel	México	PS	808		
Maria W	México	LP	102		
Neptuno	México	PS	793		
Tatiana	México	LP	97		
Cervantes	Panamá	PS	775		
San Marino I	Panamá	PS	796		
Cape Ferrat	USA—EE.UU.	PS	1,561		
Evelina Da Rosa	USA—EE.UU.	PS	1,700		
Lady Elizabeth	USA—EE.UU.	PS	337		
Legacy	USA—EE.UU.	PS	1,275		
Mauritania	USA—EE.UU.	PS	398		
Sea Encounter	USA—EE.UU.	PS	2,123		

TABLE 3. Preliminary estimates of the retained catches of tunas in the EPO from January 1 through March 30, 2003, in metric tons.
TABLA 3. Estimaciones preliminares de las capturas retenidas de atúnes capturadas en el OPO del 1 de enero al 30 de marzo de 2003, en toneladas métricas.

Flag	Yellowfin	Skipjack	Bigeye	Bluefin	Albacore	Bonito	Black skipjack	Other[1]	Total	Percentage of total
Bandera	**Aleta amarilla**	**Barrilete**	**Patudo**	**Aleta azul**	**Albacora**	**Bonito**	**Barrilete negra**	**Otro[1]**	**Total**	**Porcentaje de total**
Ecuador	9,831	23,157	1,772						34,760	20.6
España—Spain	1,527	6,034	1,485						9,046	5.4
México	46,484	3,937					74		50,495	30.0
Panamá	7,674	1,505	575						9,754	5.8
Venezuela	27,191	2,700	4						29,895	17.8
Vanuatu	1,763	3,901	376						6,040	3.6
Other—Otro[2]	18,141	9,167	962					36	28,306	16.8
Total	112,611	50,401	5,174				74	36	168,296	

[1] Includes other tunas, mackerels, sharks, and miscellaneous fishes
[1] Incluye otros túnidos, caballas, tiburones, y peces diversos
[2] Includes Belize, 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 Belice, 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. Estimated retained and discarded catches by surface gear, in metric tons, of the EPO tuna fleet. "Others" includes other tunas, sharks,and miscellaneous fishes. The 2001 and 2002 data are preliminary. Additional information concerning this table is given in the text.

TABLA 4. Estimaciones de capturas retenidas y descartadas, en toneladas métricas, por artes de superficie de la flota atunera del OPO. "Otros" incluye otros atunes, tiburones, y peces diversos. Los datos de 2001 y 2002 son preliminares. En el texto se presenta información adicional sobre esta tabla.

Year	Yellowfin			Skipjack			Bigeye			Bluefin		
	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Año	Aleta amarilla			Barrilete			Patudo			Aleta azul		
	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total
1970	155,626		155,626	56,020		56,020	1,332		1,332	3,966		3,966
1971	122,839		122,839	104,721		104,721	2,566		2,566	8,360		8,360
1972	177,127		177,127	33,409		33,409	2,238		2,238	13,347		13,347
1973	205,253		205,253	43,954		43,954	1,979		1,979	10,744		10,744
1974	210,364		210,364	78,803		78,803	890		890	5,617		5,617
1975	202,142		202,142	123,868		123,868	3,723		3,723	9,583		9,583
1976	236,347		236,347	126,287		126,287	10,243		10,243	10,645		10,645
1977	198,816		198,816	86,337		86,337	7,055		7,055	5,473		5,473
1978	180,594		180,594	169,895		169,895	11,759		11,759	5,397		5,397
1979	189,674		189,674	132,024		132,024	7,532		7,532	6,117		6,117
1980	159,425		159,425	130,671		130,671	15,421		15,421	2,939		2,939
1981	181,813		181,813	119,606		119,606	10,091		10,091	1,089		1,089
1982	125,084		125,084	98,757		98,757	4,102		4,102	3,150		3,150
1983	94,256		94,256	58,142		58,142	3,260		3,260	853		853
1984	145,061		145,061	60,551		60,551	5,936		5,936	881		881
1985	216,992		216,992	49,460		49,460	4,532		4,532	4,055		4,055
1986	268,274		268,274	63,552		63,552	1,939		1,939	5,085		5,085
1987	272,247		272,247	62,345		62,345	776		776	1,005		1,005
1988	288,403		288,403	85,326		85,326	1,053		1,053	1,424		1,424
1989	289,375		289,375	92,374		92,374	1,470		1,470	1,170		1,170
1990	273,329		273,329	72,575		72,575	4,712		4,712	1,542		1,542
1991	239,121		239,121	63,260		63,260	3,740		3,740	461		461
1992	239,849		239,849	83,964		83,964	5,497		5,497	1,999		1,999
1993	232,071	5,040	237,111	87,357	10,589	97,946	8,069	585	8,654	879		879
1994	219,261	4,614	223,875	74,534	10,314	84,848	29,375	2,305	31,680	1,062		1,062
1995	223,776	5,345	229,121	138,239	16,621	154,860	37,328	3,262	40,590	874		874
1996	250,170	6,660	256,830	112,205	24,970	137,175	51,353	5,786	57,139	8,259		8,259
1997	258,042	5,631	263,462	161,888	31,867	193,755	51,627	5,627	57,254	2,807	3	2,810
1998	265,781	4,718	270,437	145,115	22,856	167,971	35,154	2,853	38,007	2,223		2,223
1999	295,677	6,628	302,305	266,182	26,813	292,995	40,610	5,166	45,776	3,092	54	3,146
2000	273,245	6,815	279,226	211,252	26,364	237,616	70,153	5,624	75,777	4,127		4,127
2001	396,122	7,921	403,962	145,626	13,516	159,142	42,846	1,261	44,107	1,309	4	1,313
2002	418,967	3,956	422,923	158,043	12,793	170,836	35,201	977	36,178	2,121	6	2,127

TABLE 4. (continued)
TABLA 4. (continuación)

Year	Albacore			Bonito			Black skipjack			Others			All species combined		
	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Año	Albacora			Bonito			Barrilete negro			Otros			Todas las especies		
	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total
1970	4,476		4,476	4,738		4,738	0		0	27		27	226,185		226,185
1971	2,490		2,490	9,600		9,600	6		6	61		61	250,643		250,643
1972	4,832		4,832	8,872		8,872	601		601	367		367	240,793		240,793
1973	2,316		2,316	7,864		7,864	1,674		1,674	355		355	274,139		274,139
1974	4,783		4,783	4,436		4,436	3,742		3742	985		985	309,620		309,620
1975	3,332		3,332	16,838		16,838	511		511	277		277	360,274		360,274
1976	3,733		3,733	4,370		4,370	1,526		1,526	1,327		1,327	394,478		394,478
1977	1,963		1,963	11,275		11,275	1,458		1,458	1,950		1,950	314,327		314,327
1978	1,745		1,745	4,837		4,837	2,162		2,162	806		806	377,195		377,195
1979	327		327	1,805		1,805	1,366		1,366	1,249		1,249	340,094		340,094
1980	601		601	6,110		6,110	3,680		3,680	953		953	319,800		319,800
1981	739		739	5,918		5,918	1,911		1,911	1,010		1,010	322,177		322,177
1982	553		553	2,121		2,121	1,338		1,338	783		783	235,888		235,888
1983	456		456	3,829		3,829	1,236		1,236	1,709		1,709	163,741		163,741
1984	5,351		5,351	3,514		3,514	666		666	987		987	222,947		222,947
1985	919		919	3,604		3,604	296		296	536		536	280,394		280,394
1986	133		133	490		490	595		595	1,140		1,140	341,208		341,208
1987	417		417	3,326		3,326	557		557	1,612		1,612	342,285		342,285
1988	288		288	9,550		9,550	1,267		1,267	1,297		1,297	388,608		388,608
1989	1		1	12,095		12,095	783		783	1,072		1,072	398,340		398,340
1990	184		184	13,856		13,856	792		792	944		944	367,934		367,934
1991	834		834	1,288		1,288	446		446	649		649	309,799		309,799
1992	255		255	978		978	104		104	762		762	333,408		333,408
1993	1	0	1	599	12	611	104	3,950	4,054	314	1,981	2,295	329,394	22,157	351,551
1994	85	0	85	8,692	145	8,837	188	805	993	419	522	941	333,616	18,705	352,321
1995	465	2	467	8,009	55	8,064	187	1,415	1,602	172	668	840	409,050	27,368	436,418
1996	83	0	83	655	1	656	704	2,417	3,121	219	1,052	1,271	423,648	40,886	464,534
1997	60	0	60	1,104	5	1,109	101	2,582	2,683	148	3,407	3,555	475,777	49,122	524,899
1998	124	0	124	1,337	5	1,342	528	1,857	2,385	168	1,233	1,401	450,430	33,522	483,952
1999	274	0	274	1,710	0	1,710	178	3,412	3,590	218	3,096	3,314	607,941	45,169	653,110
2000	149	0	149	615	0	615	293	1,885	2,178	364	1,496	1,860	560,198	42,184	602,382
2001	20	0	20	18	0	18	1,961	1,261	3,222	441	766	1,207	588,343	24,729	613,072
2002	33	0	33	0	0	0	1,202	1,939	3,141	1,039	1,828	2,867	616,262	21,499	638,105

TABLE 5. Preliminary estimates of the retained catches and landings, in metric tons, of tunas caught by surface gear in the EPO in 2002, by species and vessel flag (upper panel) and location where processed (lower panel). Misc. = other species, including other tunas, sharks, and miscellaneous fishes

TABLA 5. Estimaciones preliminares de las capturas retenidas y descargas de atún capturado con artes de superficie en el OPO en 2002, por especie y bandera del buque (panel superior) y localidad donde fue procesado (panel inferior), en toneladas métricas. Misc. = otras especies, incluyendo otros túnidos, tiburones, y peces diversos.

Flag	Yellowfin	Skipjack	Bigeye	Bluefin	Albacore	Bonito	Black skipjack	Miscellaneous	Total	Percent of total
Bandera	**Aleta amarilla**	**Barrilete**	**Patudo**	**Alea azul**	**Albacora**	**Bonito**	**Barrilete negro**	**Miscelá-neo**	**Total**	**Porcentaje del total**
Retained catches—Capturas retenidas										
Colombia	30,291	2,299	151	0	0	0	0	329	33,070	5.4
Ecuador	38,710	77,285	18,185	0	0	0	588	632	135,400	22.0
España—Spain	5,199	22,076	4,606	0	0	0	0	0	31,881	5.2
México	151,969	8,822	3	1,727	0	30	390	0	162,941	26.4
Panamá	20,017	7,468	1,299	0	0	0	0	0	28,784	4.7
U.S.A.—EE.UU.	8,650	3,759	1,717	394	0	3	224	64	14,811	2.4
Venezuela	119,858	3,888	293	0	0	0	0	0	124,039	20.1
Vanuatu	5,717	6,792	1,912	0	0	0	0	0	14,421	2.3
Other—Otros[1]	38,556	25,654	7,035	0	0	0	0	14	71,259	11.6
Total	418,967	158,043	35,201	2,121	0	33	1,202	1,039	616,606	
Landings—Descargas										
Colombia	29,181	2,700	1,012	0	0	0	0	0	32,893	5.2
Costa Rica	36,435	2,566	354	0	0	0	0	0	39,355	6.2
Ecuador	99,627	126,597	30,794	0	0	0	588	976	258,582	40.9
España—Spain	8,467	5,497	463	0	0	0	0	0	14,427	2.3
México	148,684	8,736	3	1,727	0	29	389	0	159,568	25.2
U.S.A.—EE.UU.	6,424	1,318	64	394	0	3	224	64	8,491	1.3
Venezuela	29,966	350	0	0	0	0	0	0	30,316	4.8
Other-Otros[2]	66,955	16,851	4,692	0	0	0	0	0	88,498	14.0
Total	425,739	164,615	37,382	2,121	0	32	1,201	1,040	632,130	

[1] Includes Belize, Bolivia, El Salvador, Guatemala, Honduras, Nicaragua, Peru, and unidentified. This category is used to avoid revealing the operations of individual vessels or companies.

[1] Incluye Belice, Bolivia, El Salvador, Guatemala, Honduras, Nicaragua, Perú, y no identificados. Se usa esta categoría para no revelar información sobre las actividades de buques o empresas individuales.

[2] Includes Canada, El Salvador, French Polynesia, Guatemala, Panama, Peru, and unidentified. This category is used to avoid revealing the operations of individual vessels or companies.

[2] Incluye Canadá, El Salvador, Guatemala, Panamá, Perú, Polinesia Francesa, y no identificados. Se usa esta categoría para no revelar información sobre las actividades de buques o empresas individuales.

TABLE 6. Preliminary data on the sampling coverage of trips by vessels with capacities greater than 363 metric tons by the programs of the IATTC, Ecuador, the European Union, Mexico, Venezuela, and the Forum Fisheries Agency (FFA) during the first quarter of 2003.
TABLA 6. Datos preliminares de la cobertura de muestreo de viajes de buques con capacidad más que 363 toneladas métricas por los programas de la CIAT, Ecuador, México, el Unión Europea, Venezuela, y el Forum Fisheries Agency (FFA) durante el primero trimestre de 2003.

Flag	Trip	Observed by program				Percent observed
		IATTC	National	FFA	Total	
Bandera	**Viaje**	**Observado por programa**				**Porcentaje observado**
		CIAT	**Nacional**	**FFA**	**Total**	
Bolivia	16	13			13	81.2
Colombia	9	9			9	100.0
Ecuador	80	53	27		80	100.0
España—Spain	11	7	4		11	100.0
Guatemala	7	7			7	100.0
Honduras	5	5			5	100.0
México	76	41	35		76	100.0
Panamá	15	15			15	100.0
Perú	3	3			3	100.0
El Salvador	6	6			6	100.0
U.S.A.—EE.UU.	6	5		1	6	100.0
Venezuela	47	23	24		47	100.0
Vanuatu	11	11			11	100.0
Total	292[1]	198[1]	90[1]	1[1]	289[1]	99.0

[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

TABLE 7. Oceanographic and meteorological data for the Pacific Ocean, October 2002-March 2003. The values in parentheses are anomalies.
TABLA 7. Datos oceanográficos y meteorológicos del Océano Pacífico, octubre 2002-marzo 2003. Los valores en paréntesis son anomalías.

Month—Mes	10	11	12	1	2	3
SST—TSM, 0°-10°S, 80°-90°W (°C)	21.2 (0.3)	22.3 (0.6)	23.4 (0.6)	24.4 (-0.1))	25.8 (-0.2)	26.0 (-0.5)
SST—TSM, 5°N-5°S, 90°-150°W (°C)	25.9 (1.0)	26.4 (1.4)	26.5 (1.4)	26.4 (0.8)	26.7 (0.3)	27.3 (0.2)
SST—TSM, 5°N-5°S, 120°-170°W (°C)	28.1 (1.5)	28.3 (1.8)	28.1 (1.6)	27.8 (1.2)	27.5 (0.8)	27.8 (0.7)
SST—TSM, 5°N-5°S, 150W°-160°E (°C)	29.6 (1.1)	29.8 (1.5)	29.5 (1.2)	29.3 (1.1)	29.0 (1.0)	29.0 (0.9)
Thermocline depth—Profundidad de la termoclina, 0°, 80°W (m)	40	40	50	40	25	20
Thermocline depth—Profundidad de la termoclina, 0°, 110°W (m)	90	110	100	80	60	40
Thermocline depth—Profundidad de la termoclina, 0°, 150°W (m)	170	170	150	150	140	140
Thermocline depth—Profundidad de la termoclina, 0°, 180°W (m)	170	160	160	150	150	150
Sea level—Nivel del mar, La Libertad, Ecuador (cm)	232.3 (2.8)	238.9 (9.3)	231.8 (1.4)	220.6 (-10.0)	225.6 (-6.1)	226.9 (-3.7)
Sea level—Nivel del mar, Callao, Perú (cm)	109.0 (3.4)	108.6 (1.7)	112.6 (4.0)	111.8 ((0.3)	101.1 (-13.0)	110.6 (-4.1)
SOI—IOS	-0.7	-0.6	-1.4	-0.4	-1.2	-1.0
SOI*—IOS*	-2.67	0.62	-0.81	1.50	1.32	-2.07
NOI*—ION*	-0.02	-1.92	-5.86	-2.52	-0.07	-0.57