

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

July-September 2001
Julio-Septiembre 2001

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The
QUARTERLY REPORT

July-September 2001

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.

The Quarterly Reports are sent to the Commissioners, their industry advisors, and a few organizations and individuals with needs for current knowledge of the tuna fishery.

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.

Los Informes Trimestrales son enviados a los Comisionados, a los asesores de la industria, y a algunas organizaciones y personas que necesitan estar al corriente de los acontecimientos de la pesca atunera.

Editor--Redactor:
William H. Bayliff

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 collected 319 length-frequency samples and abstracted the logbook information for 279 trips of fishing vessels during the third quarter of 2001.

Also, during the third quarter members of the field office staffs placed IATTC observers on 116 fishing trips by vessels that participate in the on-board observer program. In addition, 116 IATTC observers completed trips during the quarter, and were debriefed at the corresponding field offices.

Surface fleet and surface catch statistics

Statistical data from the IATTC's field stations are continuously being collected and processed. 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. In this report, therefore, only annual statistics are compared among years.

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 2001 is about 196,250 cubic meters (m³) (Table 1). The weekly average at-sea capacity for the fleet, for the weekly periods ending July 2 through October 1, was about 114,300 m³ (range: 106,300 to 127,400 m³). Data on the tuna fleet of the EPO are given in Table 2. The changes of flag and additions to and deletions from the IATTC's fleet list for the period of July 3-October 1 are given in Table 3.

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

Catch statistics

The total catches of tunas in the EPO for the January 1-October 1, 2001, period were estimated to be about 319 thousand mt of yellowfin, 112 thousand mt of skipjack, and 32 thousand mt of bigeye. The averages and ranges for the comparable periods of 1996-2000 are as follows: yellowfin, 216 thousand mt (203 to 240 thousand); skipjack, 135 thousand mt (77 to 220 thousand); bigeye, 36 thousand mt (22 to 62 thousand). For this period the average estimated weekly catches of yellowfin, skipjack, and bigeye in the EPO were about 8 thousand, 3 thousand and 1 thousand mt respectively. Summaries of the estimated catches, by flag of vessel, are shown in Table 4.

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 carrying capacities greater than 363 mt), and only data for Class-6 purse seiners are included herein for comparisons among years. There are now far fewer baitboats than in previous years, so the baitboat data 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.

The catch per day of fishing (CPDF) for yellowfin in the Commission's Yellowfin Regulatory Area (CYRA) by purse seiners during the 2001 report period is estimated to have been about 16.7 mt, which is much greater than the range of rates observed during the 1996-2000 report periods (9.2 to 12.6 mt) (Table 5). The CPDF of yellowfin in the CYRA by baitboats during the 2001 report period is estimated to have been about 4.9 mt, which is also much greater than the range of rates observed during the 1996-2000 report periods (1.5 to 3.5 mt) (Table 5).

During the 1996-2000 report periods the CPDF of yellowfin by purse seiners north of 5°N ranged from about 12.9 to 18.2 mt, averaging about 15.3 mt, whereas south of 5°N it ranged from about 4.8 to 7.4 mt, averaging about 5.7 mt. Preliminary estimates for 2001 show the CPDFs of yellowfin north and south of 5°N to have been about 23.8 and 12.5 mt, respectively.

The CPDF of skipjack in the EPO by purse seiners during the 2001 report period is estimated to have been about 5.5 mt, which falls within the range of rates observed during the 1996-2000 report periods (3.9 to 10.6 mt) (Table 6). The CPDF of skipjack in the EPO by baitboats during the 2001 report period is estimated to have been about 0.2 mt, which is equal to the minimum rate observed during the 1996-2000 report periods (0.2 to 2.2 mt) (Table 6).

In general, the greatest catches of skipjack are taken in waters south of 5°N. During the 1996-2000 periods the CPDF of skipjack by purse seiners south of 5°N averaged about 10.3 mt (range: about 5.3 to 21.7 mt), whereas north of 5°N it averaged about 2.7 mt (range: about 1.8 to 3.9 mt). Preliminary estimates for 2001 show the CPDFs of skipjack south and north of 5°N to have been about 7.3 and 2.3 mt, respectively.

The CPDF of bigeye in the EPO by purse seiners during the 2001 report period is estimated to have been about 2.0 mt, which falls within the range of the rates observed during the 1996-2000 period (0.9 to 2.7 mt) (Table 7).

Size compositions of the surface catches of tunas

The methods for sampling the catches of tunas have been changed, beginning on January 1, 2000, as described in the IATTC Quarterly Report for April-June 2000. Briefly, the fish in a well of a purse seiner or baitboat 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), based on the staff's most recent stock assessments.

Data for fish caught during the second quarter of 2001 are presented in this report. Two length-frequency histograms are presented for each species. The first shows the data by stratum (area, gear type, and set type) for the second quarter. The second, which is similar to those of previous years, shows the second-quarter catch for the current year and the previous five years.

There are ten yellowfin surface fisheries defined for stock assessments: four floating-object, two unassociated school, three dolphin, and one baitboat (Figure 1). Of the 253 wells

sampled, 215 contained yellowfin. The estimated size compositions of the fish caught during the second quarter of 2001 are shown in Figure 2a. The majority of the yellowfin catch was taken in the unassociated and dolphin fisheries. Small amounts of yellowfin were caught by the floating-object fisheries and by baitboats.

The estimated size compositions of the yellowfin caught by all fisheries combined during the second quarter of 1996-2001 are shown in Figure 2b. Although the average weights of the fish caught during the first and second quarters of 2001 were similar, the length distributions of the fish during the latter period were more evenly distributed between 40 and 160 cm.

There are eight skipjack fisheries defined for stock assessments: four floating object, two unassociated school, one dolphin, and one baitboat (Figure 1). The last two fisheries include all 13 sampling areas. Of the 253 wells sampled, 126 contained skipjack. The estimated size compositions of the fish caught during the second quarter of 2001 are shown in Figure 3a. As was the case during the first quarter, the majority of the fish was taken by floating-object sets in the southern area. Skipjack were sampled from catches taken by baitboats, but the estimated catches were too small to show well in the graphs.

The estimated size compositions of the skipjack caught by all fisheries combined during the second quarter of 1996-2001 are shown in Figure 3b. The estimated catch of skipjack taken during the first half of 2001 was considerably less than during the previous two years. The skipjack taken during the second quarter were, on average, larger than those taken during the first quarter of 2001.

There are seven bigeye surface fisheries defined for stock assessments: four floating-object, one unassociated school, one dolphin, and one baitboat (Figure 1). The last three fisheries include all 13 sampling areas. Of the 253 wells sampled, 57 contained bigeye. The estimated size compositions of the fish caught during the second quarter of 2001 are shown in Figure 4a. The majority of the bigeye was caught in sets made on floating objects in the Galapagos and southern areas. Bigeye were sampled from floating-object sets in the north, unassociated school sets, and dolphin sets, but the estimated catches were too small to show well in the graphs. There were no recorded catches of bigeye by baitboats.

The estimated size compositions of the bigeye caught by all fisheries combined during the second quarter of 1996-2001 are shown in Figure 4b. For each of the past three years, the average weight of the fish caught during the second quarter has been considerably greater than that of the fish caught during the first quarter.

Observer program

Data collection

The design for placement of observers during 2001 calls for 100-percent coverage of fishing trips in the eastern Pacific Ocean (EPO) by Class-6 purse seiners (over 363 metric tons carrying capacity). Mexico's national observer program, the Programa Nacional de Aprovechamiento del Atún y de Protección de Delfines (PNAAPD), and Venezuela's national observer program, the Programa Nacional de Observadores de Venezuela (PNOV), are to sample half of the trips by vessels of their respective fleets, while IATTC observers are to sample the other half of those trips. Ecuador's national observer program, the Programa Nacional de Observadores Pesqueros de Ecuador (PROBECUADOR) has been sampling approximately one quarter of the trips by vessels of its fleet this year, and IATTC observers are to sample the

remainder of those trips. The IATTC will sample all trips of Class-6 vessels registered in other nations that fish for tunas in the EPO.

IATTC, PNAAPD, PNOV, and PROBECUADOR observers departed on 171 fishing trips aboard Class-6 purse seiners during the third quarter of 2001. One trip by a Bolivian vessel that was only partially observed by the IATTC is not being considered as a sampled trip for observer coverage purposes. Preliminary coverage data for these vessels during the quarter are shown in Table 8.

Training

There were no IATTC observer training courses held during the third quarter of 2001.

RESEARCH

Bluefin tagging

Scientists from the Monterey Bay Aquarium tagged 85 bluefin with IATTC dart tags off northern Baja California on July 15-24, 2001. Returns from two of these fish have been received, both from fish recaptured off northern Baja California during August 2001.

Apparent abundance of sharks in the EPO

A resolution on bycatch passed at the 66th meeting of the IATTC, in June 2000, stated that there is a need for information on the bycatches by longliners and other tuna fishing vessels. Due to their long life spans, slow growth, and low fecundity, sharks are particularly vulnerable to overexploitation, so it is important that the effects of the longline and surface fisheries on sharks be investigated. Published data on longline catches of sharks, tunas, and billfishes in the eastern Pacific Ocean are summarized in Table 9. It would seem that if sharks are more vulnerable to exploitation than are tunas and billfishes the percentages of sharks in the catches would have decreased over the period encompassed by those studies, but such does not appear to be the case. The differences in the results obtained by different investigators could be due to differences in locations and/or seasons of sampling, gear configuration, *etc.*, however. This applies especially to the study of 1988-1989, which was conducted to investigate the possibility of establishing a longline fishery for sharks off California without catching marlins, which are the object of an important recreational fishery. Japanese scientists (Fish. Sci., 65 (1): 16-22) compared the CPUEs of oceanic whitetip (*Carcharhinus longimanus*), silky (*C. falciformis*), blue (*Prionace glauca*), and thresher (*Alopias* spp.) sharks by Japanese research and training vessels in four areas of the Pacific Ocean during 1967-1970 and 1992-1995, and found that they did not change much over that period. U.S. and Mexican scientists (Fish. Res., 39 (2): 115-125) showed that the mean lengths of thresher and blue sharks caught by the California gillnet fishery decreased during 1981-1994 and 1990-1994, respectively, which could indicate that their abundance decreased during those periods. No trend is discernable for shortfin mako shark (*Isurus oxyrinchus*) during 1982-1994, however.

Early life history studies

Yellowfin broodstock

The yellowfin broodstock in Tank 1 (1,362,000 L) at the Ashotines Laboratory spawned daily during July through September. The water temperatures in the tank ranged from 28.0° to 29.0°C during the quarter. The numbers of eggs collected after each spawning event ranged from about 30,000 to 993,000. Spawning occurred as early as 5:00 p.m. and as late as 5:45 p.m.

There were two mortalities in Tank 1, for fish of 28 and 31 kg, and at the end of that period there were two large (54 and 62 kg) and eight medium (29 to 37 kg) fish in the tank. One mortality appeared to be due to a wall strike, and the other to starvation.

There were 17 yellowfin, weighing 2.5 to 4.7 kg each, in the reserve broodstock tank (Tank 2) at the end of September.

In March 2001 six yellowfin with archival tags (electronic data storage tags) surgically implanted in their peritoneal cavities were placed into Tank 6 (170,000 L) (IATTC Quarterly Report for January-March, 2001). The experiment is being conducted to investigate whether feeding and spawning events of yellowfin can be detected by evaluating the peritoneal cavity temperature data recorded by the archival tags. There were three fish remaining at the end of the quarter, but no spawning activity had been observed.

Rearing of yellowfin eggs, larvae, and juveniles

During the quarter the following parameters were recorded for each spawning event: time 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 and corvina

The work on snappers and corvina is carried out by the Dirección General de Recursos Marinos de Panamá.

The spotted rose snapper (*Lutjanus guttatus*) broodstock, which began to spawn at the end of May 2000, continued to spawn about twice a week during the third quarter. Another group of 44 fish, hatched in captivity in October 1998, is being held in two 12,000-L tanks. On average, these fish were about 46 cm long and weighed about 1.3 kg at the end of the quarter.

One group of 12 juvenile polla drum (*Umbrina xanti*), hatched in captivity in July 1999, is being held in a 12,000-L tank. A fungal infection reduced the group from 125 to 12 fish during the quarter. The remaining fish are about 25 cm long and weigh about 170 g, on average. These fish will be used as broodstock.

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 160°W, 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 better-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.

Conditions in the ETP were essentially normal during the July and August of 2001. During September, however, there was an area of SSTs 1° to 2°C below normal off Peru and Ecuador that extended westward along the equator to about 130°W (Figure 5). The data in Table 10, for the most part, indicate that conditions were normal during most of the April-September period. Not surprisingly, in view of the fact that the SSTs were below normal off Ecuador and Peru, the sea levels were below normal at Baltra, La Libertad, and Callao. Furthermore the SOI and SOI* were above normal in September, indicating stronger-than-normal easterly winds in the southern hemisphere. Nevertheless, according to the Climate Diagnostics Bulletins of the U.S. National Weather Service for September 2001, there are indications that an El Niño episode may be developing. In September an area of above-normal SSTs appeared along the equator in the central Pacific, and the thermocline was deeper than normal in that area. These and other conditions “often result in subsequent oceanic warming in the eastern equatorial Pacific.” However, “it seems likely that the intensity of any warming will be weak or moderate.”

Dolphins

Since January 1, 2001, the IATTC staff has been reporting the cumulative mortalities of seven stocks of dolphins at weekly intervals to the Parties to the Agreement on the International Dolphin Conservation Program. The mortalities to September 30, 2001, are shown in Table 11.

GEAR PROGRAM

During the third quarter IATTC staff members participated in dolphin safety-gear inspection and safety-panel alignment procedures aboard 5 Mexican-flag purse seiners.

Two dolphin mortality reduction workshops were held during the quarter, one in Mazatlan, Mexico that was attended by 21 people including 19 fishermen, and one in La Jolla, California, USA that was attended by four people including one fisherman.

MEETINGS

Fifth meeting of the Working Group on Finance

The fifth meeting of the Working Group on Finance was held in La Jolla, California, August 29-31, 2001.

Seventh meeting of the Working Group on the IATTC Convention

The seventh meeting of the Working Group on the IATTC Convention was held in La Jolla, California, on September 3-7, 2001.

Other meetings

Dr. Michael G. Hinton was in Noumea, New Caledonia, the headquarters of the Secretariat of the Pacific Community, in mid-July 2001, where, on July 9, he participated in an

FAO-sponsored meeting of representatives of regional fisheries bodies to review the state of development and proposals for implementation of the Fisheries Global Information System (FIGIS), which is being developed by the FAO Fisheries Division, in collaboration with the FAO World Agriculture Information Center. The development of FIGIS is supported by funding from France and Japan. After that, on July 10-13, he attended the 19th meeting of the Coordinating Working Party on Fisheries Statistics.

Dr. Mark N. Maunder participated in an advanced AD Model Builder workshop in Seattle, Washington, on July 16-20, 2001.

Mr. Kurt M. Schaefer gave a presentation entitled "Movements, behavior, and habitat selection of bigeye tuna in the eastern equatorial Pacific, ascertained through archival tags" at a meeting of the Southern California District of the American Institute of Fisheries Research Biologists in San Juan Capistrano, California, on July 17, 2001.

Drs. Robin Allen, Pablo R. Arenas, Richard B. Deriso, Martín A. Hall, Cleridy E. Lennert-Cody, and Michael D. Scott, and Mr. Brian S. Hallman, participated in a consultation on the dolphin research program of the Southwest Fisheries Science Center, U.S. National Marine Fisheries Service, in La Jolla, California, on August 1, 2001.

Dr. Michael G. Hinton spent the period of August 2-17, 2001, in Noumea, New Caledonia, where he attended the 14th meeting of the Standing Committee on Tuna and Billfish (SCTB). He participated in the Methods Working Group, the Statistics Working Group, and the several species working groups. In addition, he and Dr. Pierre M. Kleiber of the U.S. National Marine Fisheries Service completed a Pacific-wide analysis of the status of blue marlin, using Multifan-CL, which was presented at the SCTB meeting. Also, he presented a talk to the Ocean Atlas users group on the Argo project, which will obtain temperature and salinity profiles, using long-lived floats placed over a 3-degree grid in all the oceans of the world.

Following the meeting of the SCTB, Dr. Hinton traveled to Cairns, Australia, to participate in the Third International Billfish Symposium, which took place on August 19-23, 2001. He served as a member of the Organizing Committee for the Symposium, and chaired a session on Stock Assessment of the World's Billfish. In addition, he presented three papers: *Stock Assessment of Blue Marlin in the Pacific with Multifan-CL* (by Kleiber, Hinton, and Uozumi); *Status of Striped Marlin, *Tetrapturus audax*, in the Eastern-Central Pacific* (by Hinton, Maunder, and Uozumi); and *Status of Fisheries and Swordfish in the Eastern Pacific Ocean* (by Hinton), and was a co-author of *Genetic Analyses of Nuclear and Mitochondrial DNA Data Indicate Heterogeneity of Swordfish within the Pacific Ocean* (by Alvarado-Bremer, Hinton, and Greig).

Mr. Kurt M. Schaefer participated in a workshop entitled "Modern approaches to assess maturity and fecundity of warm- and cold-water fish and squids," held in Bergen, Norway, on September 4-7, 2001. Twenty-two scientists from ten nations attended the workshop, which was sponsored by the Institute of Marine Research (IMR), Bergen, Norway, the Research Council of Norway (RCN), and the Norwegian Agency of Development Cooperation (NORAD) and the Nansen Programme at the IMR. Mr. Schaefer presented a paper entitled "Estimation of the maturity and fecundity of tunas" at the workshop.

Dr. Robin Allen spent the period of September 16-October 5, 2001, in Europe, where he participated in the Conference on Responsible Fisheries in the Marine Ecosystem in Reykjavik, Iceland, and the II European Conference of Tuna in Vigo, Spain.

PUBLICATIONS

Bulletin

Vol. 22, No. 1

Margulies, Daniel. Preface

Daniel Margulies, Jeanne B. Wexler, Kevin T. Bentler, Jenny M. Suter, Shukei Masuma, Nobuhiro Tezuka, Kazuhisa Teruya, Masakazu Oka, Masaei Kanematsu, and Hideki Nikaido. Food selection of yellowfin tuna, *Thunnus albacares*, larvae reared in the laboratory

Wexler, Jeanne B., Daniel Margulies, Shukei Masuma, Nobuhiro Tezuka, Kazuhisa Teruya, Masakazu Oka, Masaei Kanematsu, and Hideki Nikaido. Age validation and growth of yellowfin tuna, *Thunnus albacares*, larvae reared in the laboratory

Other publications

Deriso, Richard B., and William H. Bayliff. 2000. The status of Pacific tuna stocks. *In* Hinman, Ken (editor), *Getting Ahead of the Curve: Conserving the Pacific Ocean's Tunas, Swordfish, Billfishes and Sharks*, National Coalition for Marine Conservation, Symposium 16: 12-30.

Hall, Martin A., and Peter G. Williams. 2000. Bycatch in the tuna net fisheries. *In* Hinman, Ken (editor), *Getting Ahead of the Curve: Conserving the Pacific Ocean's Tunas, Swordfish, Billfishes and Sharks*, National Coalition for Marine Conservation, Symposium 16: 72-81.

Allen, Robin. 2000. The Inter-American Tropical Tuna Commission: role, functions and future. *In* Hinman, Ken (editor), *Getting Ahead of the Curve: Conserving the Pacific Ocean's Tunas, Swordfish, Billfishes and Sharks*, National Coalition for Marine Conservation, Symposium 16: 145-152.

Scott, Michael D., Aleta A. Hohn, Andrew J. Westgate, John R. Nichols, Brent R. Whitaker, and Walton B. Campbell. 2001. A note on the release and tracking of a rehabilitated pygmy sperm whale (*Kogia breviceps*). *Jour. Cetacean Res. Manag.*, 3 (1): 87-94.

Joseph, James. 2001. A global view of tuna fisheries. II European Conference on Tuna, Asociación Nacional de Fabricantes de Conservas de Pescados y Mariscos and Centro Técnico Nacional de Conservación de Productos de la Pesca [Spain]: 175-194.

ADMINISTRATION

Dr. Yukio Takeuchi, who had been working with Drs. Michael G. Hinton, Mark N. Maunder, and George M. Watters on various aspects of bigeye assessment since September 2000, returned to Japan on August 31, 2001.

Dr. George M. Watters resigned his position to take a new one with the U.S. National Marine Fisheries Service in Monterey, California. His last day of work was September 14, 2001. Dr. Watters was hired by the IATTC in June 1997, and since then he has worked on stock assessment of tunas (with Dr. Richard B. Deriso, Dr. Mark N. Maunder, and others), on ecological studies (with Dr. Robert J. Olson), and on energetics of bluefin (with Dr. Olson and scientists of the National Research Institute of Far Seas Fisheries (NRIFSF) of Japan). Fortunately, he will continue to work with Dr. Olson and with scientists of the NRIFSF on the

latter two projects. The results of his work have been published in IATTC Bulletin, Vol. 21, No. 8, IATTC Data Report 10, and IATTC Stock Assessment Reports 1 and 2. He will be missed, but everyone wishes him the best in his new job.

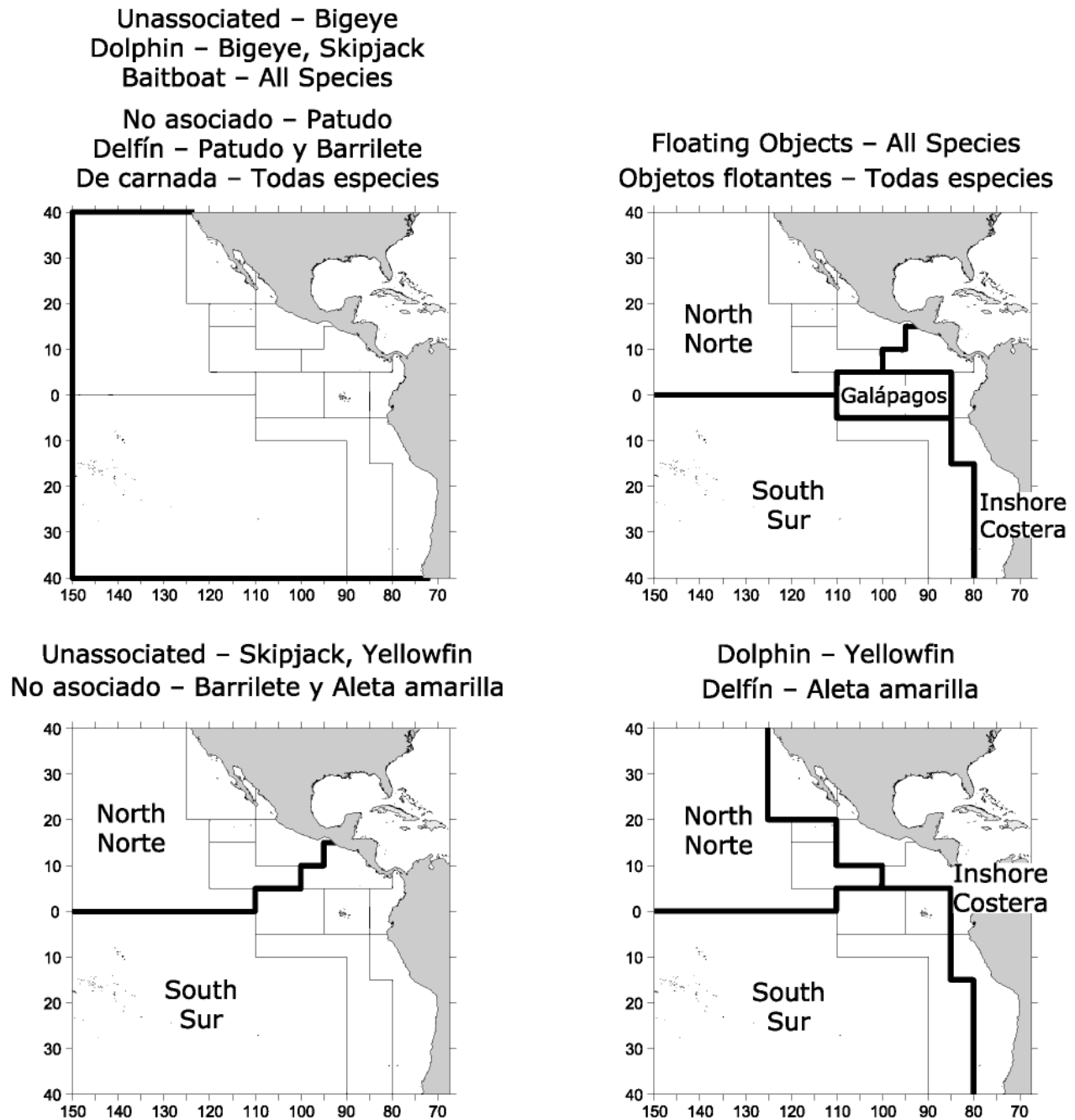


FIGURE 1. Spatial extents of the fisheries defined by the IATTC staff for stock assessment of yellowfin, skipjack, and bigeye in the EPO. The thin lines indicate the boundaries of the 13 length-frequency sampling areas, and the bold lines the boundaries of the fisheries.

FIGURA 1. Extensión espacial 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.

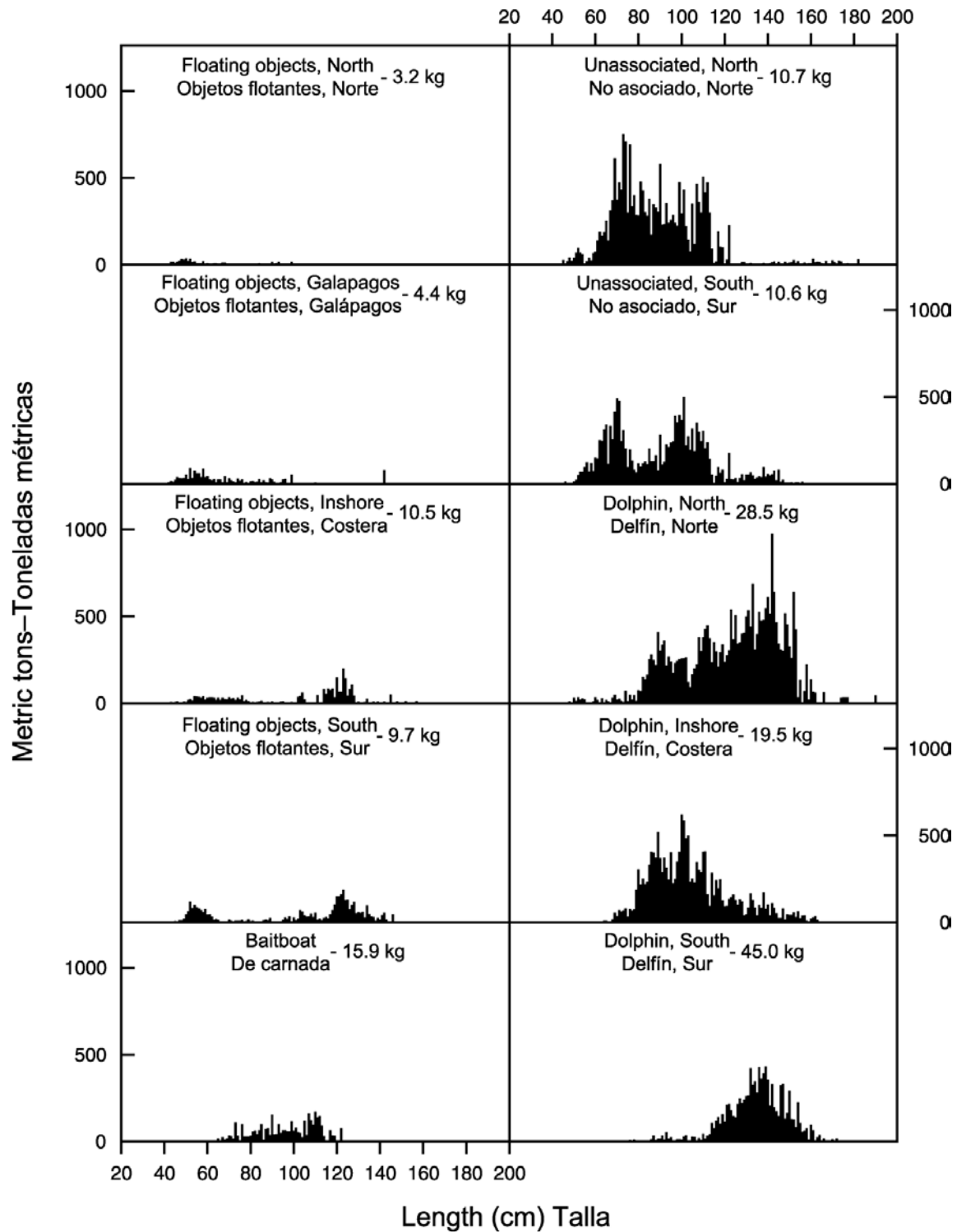


FIGURE 2a. Estimated size compositions of the yellowfin caught in each fishery of the EPO during the second quarter of 2001. The average weights of the fish in the samples are given at the tops of the panels. **FIGURA 2a.** Composición por tallas estimada para el aleta amarilla capturado en cada pesquería del OPO durante el segundo trimestre de 2001. En cada recuadro se detalla el peso promedio de los peces en las muestras.

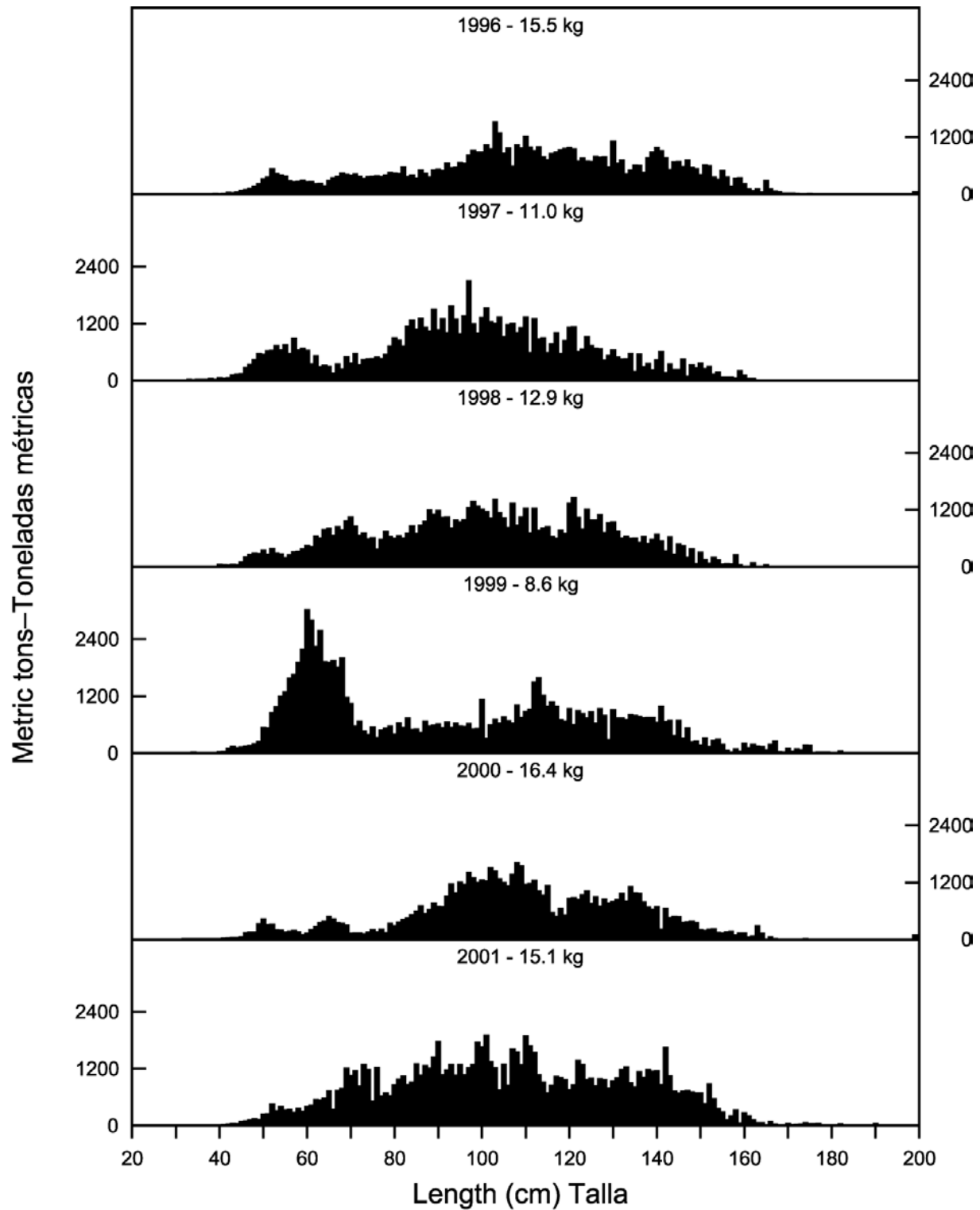


FIGURE 2b. Estimated size compositions of the yellowfin caught in the EPO during the second quarter of 1996-2001. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 2b. Composición por tallas estimada para el aleta amarilla capturado en el OPO en el segundo trimestre de 1996-2001. En cada recuadro se detalla el peso promedio de los peces en las muestras.

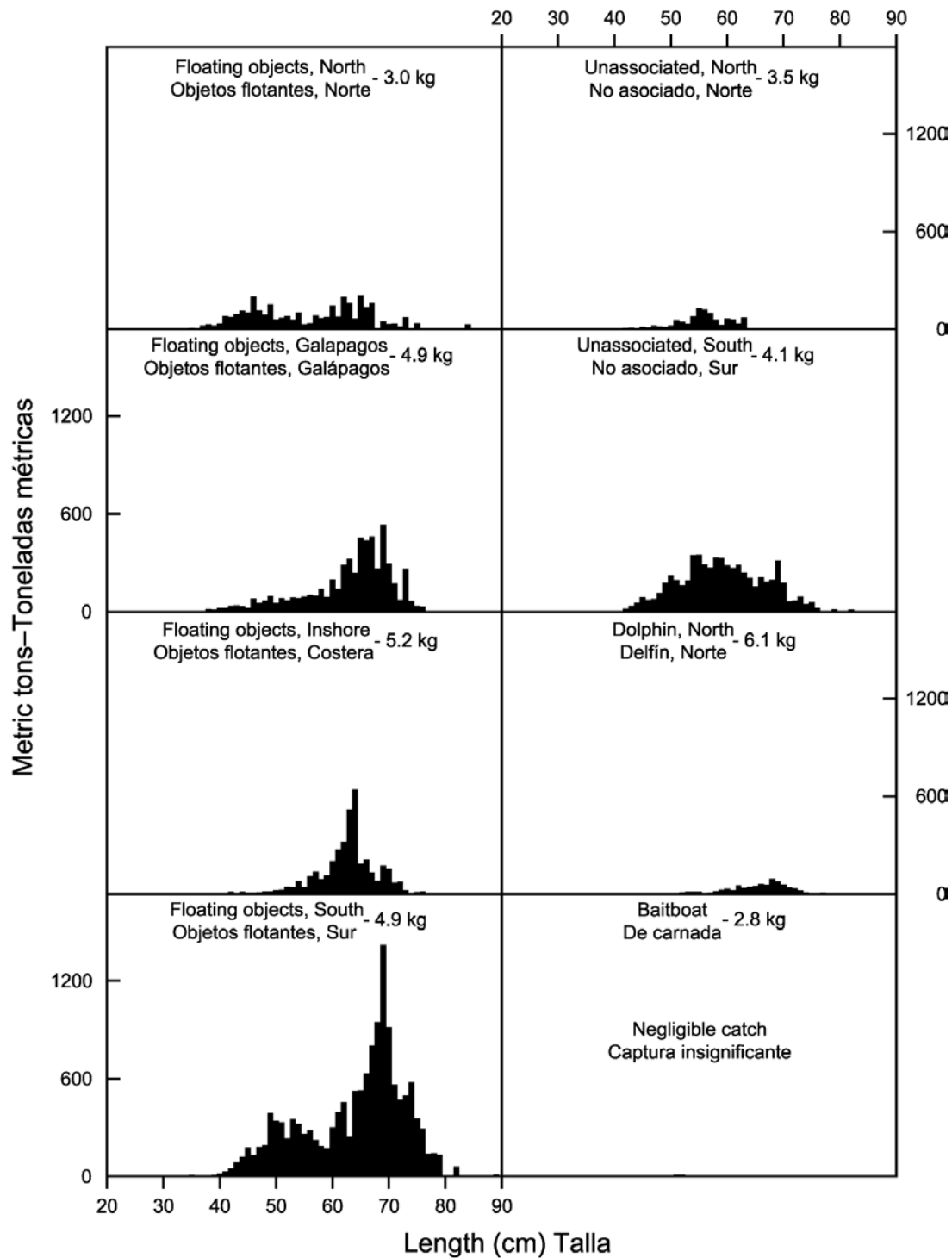


FIGURE 3a. Estimated size compositions of the skipjack caught in each fishery of the EPO during the second quarter of 2001. The average weights of the fish in the samples are given at the tops of the panels.
FIGURA 3a. Composición por tallas estimada para el barrilete capturado en cada pesquería del OPO durante el segundo trimestre de 2001. En cada recuadro se detalla el peso promedio de los peces en las muestras.

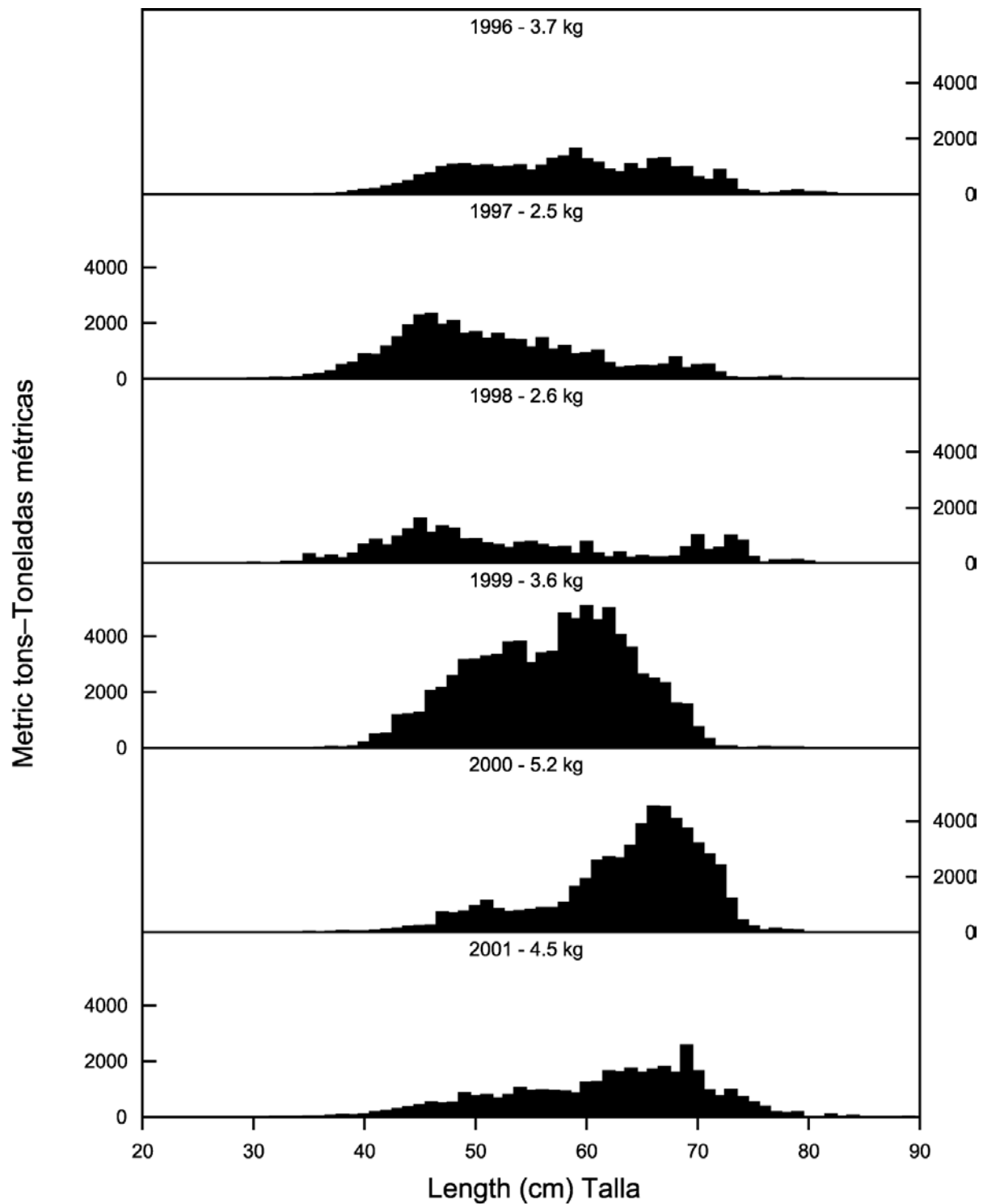


FIGURE 3b. Estimated size compositions of the skipjack caught in the EPO during the second quarter of 1996-2001. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 3b. Composición por tallas estimada para el barrilete capturado en el OPO en el segundo trimestre de 1996-2001. En cada recuadro se detalla el peso promedio de los peces en las muestras.

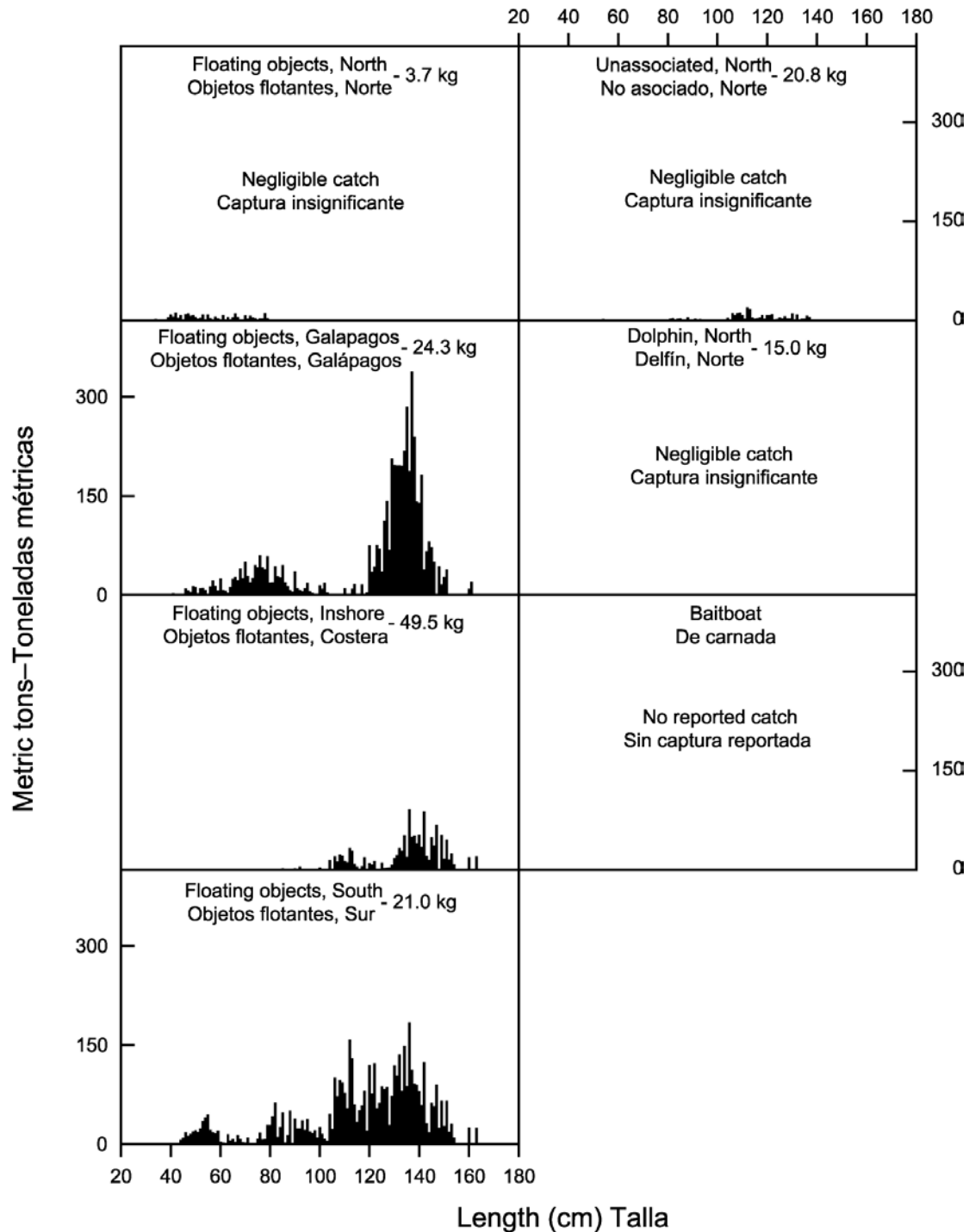


FIGURE 4a. Estimated size compositions of the bigeye caught in each fishery of the EPO during the second quarter of 2001. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 4a. Composición por tallas estimada para el patudo capturado en cada pesquería del OPO durante el segundo trimestre de 2001. En cada recuadro se detalla el peso promedio de los peces en las muestras.

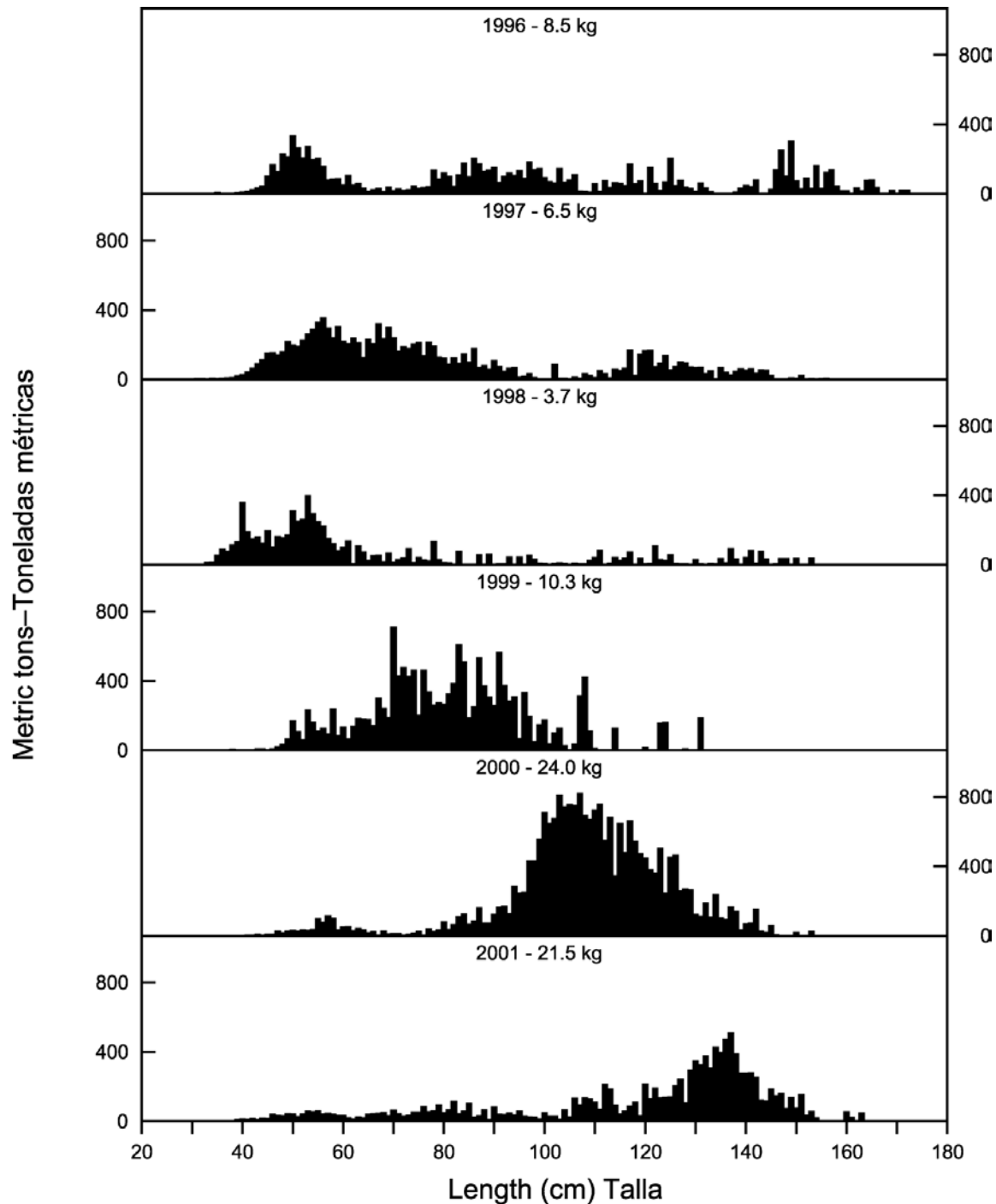


FIGURE 4b. Estimated size compositions of the bigeye caught in the EPO during the second quarter of 1996-2001. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 4b. Composición por tallas estimada para el patudo capturado en el OPO en el segundo trimestre de 1996-2001. En cada recuadro se detalla el peso promedio de los peces en las muestras.

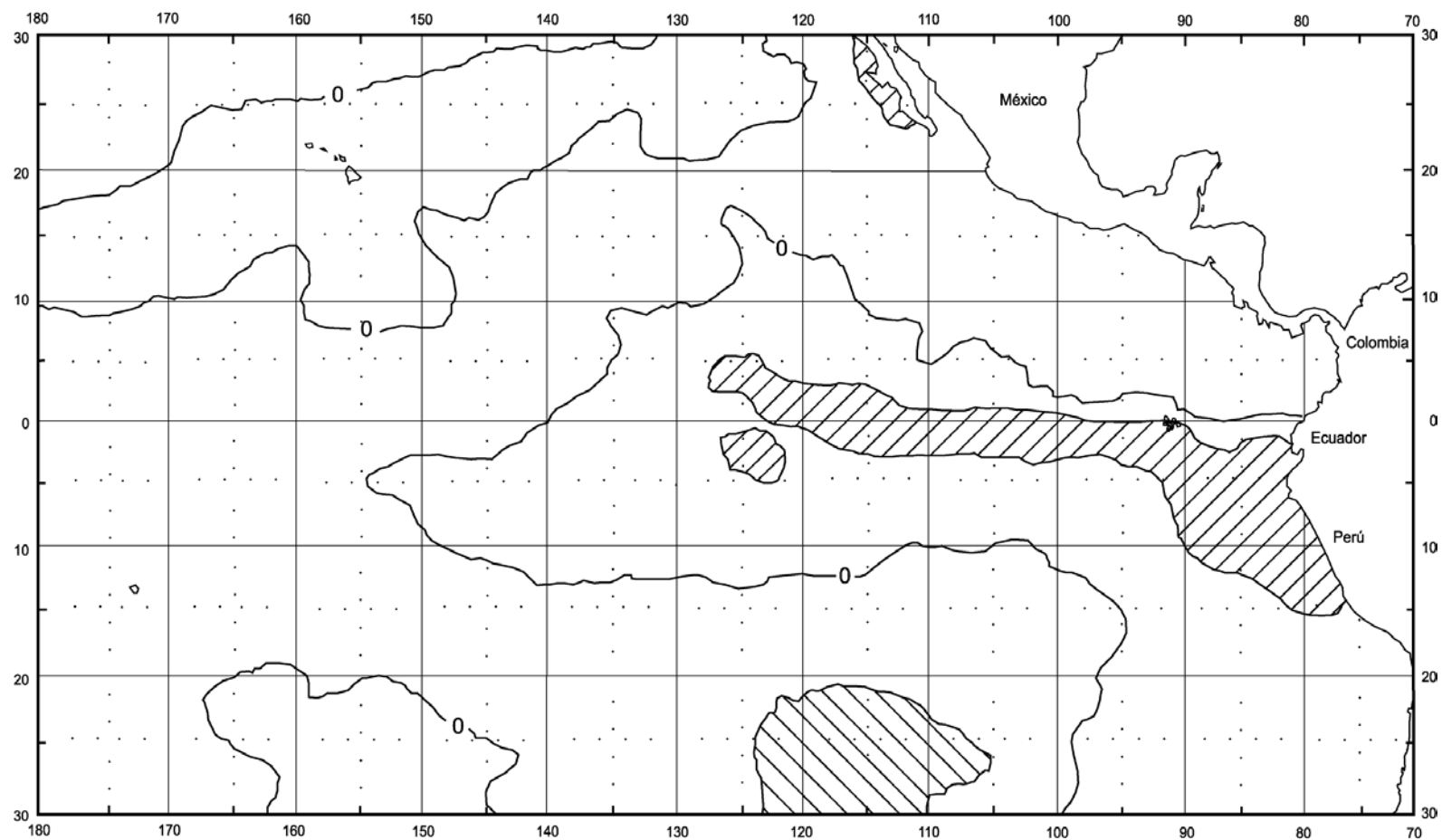


FIGURE 5. Sea-surface temperature (SST) anomalies (departures from long-term normals) for September 2001, based on data from fishing boats and other types of commercial vessels. The areas with SSTs more than 1°C below normal are hatched from lower left to upper right, and those with SSTs more than 1°C above normal are hatched from upper left to lower right.

FIGURA 5. Anomalías (variaciones de los niveles normales a largo plazo) de la temperatura superficial del mar (TSM) en septiembre de 2001, basadas en datos tomados por barcos pesqueros y otros buques comerciales. Las zonas TSM más de 1°C inferiores a lo normal están sombreadas con rayas diagonales que suben hacia la derecha, y aquellas con TSM más de 1°C superiores a lo normal con rayas diagonales que suben hacia la izquierda.

TABLE 1. Preliminary estimates of the numbers and carrying capacities, in cubic meters, of purse seiners and baitboats operating in the EPO in 2001 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; BB = baitboat.

TABLA 1. Estimaciones preliminares del número de buques cerqueros y de carnada que pescan en el OPO en 2001, y de la capacidad de acarreo de los mismos, en metros cúbicos, por bandera, arte de pesca, y clase de arqueo. Se incluye cada barco 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; BB = barco de carnada.

Flag Bandera	Gear Arte	Size class -- Clase de arqueo						Total	Capacity Capacidad
		1	2	3	4	5	6		
Number—Número									
Belize—Belice	PS	-	-	-	-	-	2	2	1,497
Bolivia	PS	-	-	-	-	-	4	4	4,636
Colombia	PS	-	-	2	1	2	5	10	7,400
Ecuador	PS	-	7	12	13	6	38	76	48,308
	BB	1	-	-	-	-	-	1	32
España—Spain	PS	-	-	-	-	-	5	5	12,137
Guatemala	PS	-	-	-	-	-	4	4	7,640
Honduras	PS	-	-	-	-	-	3	3	2,584
México	PS	-	-	6	4	8	42	60	52,757
	BB	1	4	6	-	-	-	11	1,349
Nicaragua	PS	-	-	-	-	-	1	1	1,229
Panamá	PS	-	-	2	2	-	6	10	9,517
El Salvador	PS	-	-	-	-	-	2	2	4,469
U.S.A.—EE.UU.	PS	-	3	2	-	2	5	12	7,864
Venezuela	PS	-	-	-	-	-	24	24	30,461
Vanuatu	PS	-	-	-	-	-	6	6	7,803
Undocumented— Indocumentado	PS	-	-	-	-	-	1	1	786
All flags— Todas banderas	PS	-	10	24	20	18	144	216	
	BB	2	4	6	-	-	-	12	
	PS + BB	2	14	30	20	18	144	228	
Capacity—Capacidad									
All flags— Todas banderas	PS	-	984	4,294	5,786	8,389	175,374	194,827	
	BB	85	383	913	-	-	-	1,381	
	PS + BB	85	1,367	5,207	5,786	8,389	175,374	196,208	

TABLE 2. Eastern Pacific Ocean surface fleet, by flag, vessel name, gear type (PS = purse seine; BB = baitboat), and cubic meters of fish-carrying capacity, as of October 1, 2001.

TABLA 2. La flota atunera de superficie del Océano Pacífico oriental, por bandera, nombre del barco, tipo de arte (PS = cerquero; BB = barco de carnada), y metros cúbicos de capacidad de acarreo de pescado, hasta el 1 de octubre de 2001.

Flag and vessel name	Gear type	Capacity	Flag and vessel name	Gear type	Capacity
Bandera y nombre de buque	Tipe de arte	Capacidad	Bandera y nombre de buque	Tipe de arte	Capacidad
Belize—Belice			Ecuador (cont.)		
<i>Don Italo</i>	PS	456	<i>Ingalapagos</i>	PS	318
<i>MariaJose</i>	PS	1041	<i>Intrepido</i>	PS	85
			<i>Isabel Cinco</i>	PS	1265
Bolivia			<i>Isabel Victoria V</i>	PS	389
<i>Amanda</i>	PS	1268	<i>Jacques Cartier</i>	PS	962
<i>Cabo De Hornos</i>	PS	680	<i>Jambeli IV</i>	PS	440
<i>Nazca</i>	PS	1414	<i>Jorge IV</i>	PS	162
<i>Sea Gem</i>	PS	1274	<i>José Antonio</i>	PS	144
			<i>Joselito</i>	PS	91
Colombia			<i>Killa</i>	PS	348
<i>American Eagle</i>	PS	1275	<i>Lizi</i>	PS	1038
<i>Eileen Marie</i>	PS	350	<i>Ljbuica M</i>	PS	526
<i>El Dorado</i>	PS	385	<i>Lucia T</i>	PS	738
<i>El Rey</i>	PS	1168	<i>Lucy</i>	PS	245
<i>Enterprise</i>	PS	1272	<i>Malula</i>	PS	798
<i>Grenadier</i>	PS	1176	<i>Manuel Ignacio F</i>	PS	644
<i>Patricia Lynn</i>	PS	270	<i>Maria</i>	PS	168
<i>Rocio Del Pilar</i>	PS	191	<i>Maria Fatima</i>	PS	338
<i>Sandra C</i>	PS	1175	<i>Maria Francisca</i>	PS	1041
<i>Sea Rover</i>	PS	138	<i>Medjugorje</i>	PS	843
			<i>Milagros A</i>	PS	1550
Ecuador			<i>Miry Ann D</i>	PS	497
<i>Alize</i>	PS	688	<i>Monte Cristi</i>	PS	1232
<i>Angel</i>	PS	94	<i>North Queen</i>	PS	257
<i>Balbina</i>	PS	176	<i>Pacifico</i>	PS	219
<i>Betty C</i>	PS	814	<i>Ramoncho</i>	PS	96
<i>Betty Elizabeth</i>	PS	290	<i>Roberto A</i>	PS	318
<i>Cap Berny B</i>	PS	1285	<i>Roberto M</i>	PS	1161
<i>Charo</i>	PS	1925	<i>Rocio</i>	PS	1366
<i>Dominador</i>	PS	162	<i>Romeo</i>	PS	89
<i>Don Antonio</i>	PS	197	<i>Rosa F</i>	PS	662
<i>Don Bartolo</i>	PS	724	<i>Rosa Isabel</i>	BB	32
<i>Don Mario</i>	PS	552	<i>Sajambre</i>	PS	694
<i>Don Quijote</i>	PS	374	<i>San Andres</i>	PS	1359
<i>Don Santiago</i>	PS	1881	<i>San Antonio V</i>	PS	248
<i>Doña Roge</i>	PS	519	<i>San Lorenzo</i>	PS	210
<i>Doña Tula</i>	PS	603	<i>San Mateo</i>	PS	1033
<i>Drennec</i>	PS	1140	<i>Saturno</i>	PS	106
<i>Eli</i>	PS	984	<i>Southern Explorer</i>	PS	137
<i>Elizabeth F</i>	PS	738	<i>Southern Queen</i>	PS	137
<i>Emperador</i>	PS	82	<i>Sun Ranger</i>	PS	1033
<i>Erasmus F</i>	PS	701	<i>Tarqui</i>	PS	459
<i>Fernandito</i>	PS	136	<i>Ugavi</i>	PS	1875
<i>Fiorella L</i>	PS	390	<i>Via Simoun</i>	PS	1324
<i>Gabriela A</i>	PS	318	<i>Victor Andres</i>	PS	115
<i>Gloria A</i>	PS	543	<i>Victoria A</i>	PS	662
<i>Ignacio</i>	PS	1470	<i>Western Pacific I</i>	PS	274
<i>Ile Aux Moines</i>	PS	750	<i>Yelisava</i>	PS	855
<i>Indico</i>	PS	267	<i>Yolanda L</i>	PS	1168

TABLE 2. (continued)
TABLE 2. (continuación)

Flag and vessel name	Gear type	Capacity	Flag and vessel name	Gear type	Capacity
Bandera y nombre de buque	Tipe de arte	Capacidad	Bandera y nombre de buque	Tipe de arte	Capacidad
España—Spain			México (cont.)		
<i>Albacora</i>	PS	3318	<i>Cartadedeces</i>	PS	807
<i>Albacora Quince</i>	PS	1881	<i>Chac Mool</i>	PS	1190
<i>Albacora Uno</i>	PS	2800	<i>Delfin V</i>	BB	160
<i>Aurora B</i>	PS	2081	<i>Delfin X</i>	BB	152
<i>Rosita C</i>	PS	2057	<i>Don José</i>	BB	53
			<i>Donna Cristina</i>	PS	1282
Guatemala			<i>Edgar Ivan</i>	PS	316
<i>Albacora Catorce</i>	PS	1880	<i>Ensenada</i>	PS	381
<i>Albacora Doce</i>	PS	1880	<i>Erika</i>	BB	94
<i>Sant Yago Dos</i>	PS	1940	<i>Estado 29</i>	PS	725
<i>Sant Yago Uno</i>	PS	1940	<i>Excalibur</i>	PS	160
			<i>Gabiero</i>	PS	1118
Honduras			<i>Guaymas</i>	PS	359
<i>Don Tampirio</i>	PS	786	<i>Juan Pablo I</i>	PS	300
<i>Eastern Pacific</i>	PS	628	<i>Juan Pablo II</i>	PS	250
<i>Esthercho</i>	PS	1170	<i>Judith I</i>	PS	809
			<i>Lupe Del Mar</i>	PS	1298
México			<i>Macel</i>	PS	808
<i>Akalan II</i>	PS	1311	<i>Macel II</i>	PS	490
<i>Ana Maria</i>	BB	188	<i>Manolo</i>	PS	300
<i>Ariete</i>	PS	490	<i>Maranatha</i>	BB	125
<i>Arkos I Chiapas</i>	PS	1348	<i>Maria Del Mar</i>	PS	1242
<i>Arkos II Chiapas</i>	PS	1348	<i>Maria Fernanda</i>	PS	1232
<i>Atilano Castano</i>	PS	1297	<i>Maria Gabriela</i>	BB	112
<i>Atun I</i>	PS	807	<i>Maria Luisa</i>	PS	1168
<i>Atun IV</i>	PS	809	<i>Maria Rosana</i>	PS	1142
<i>Atun VI</i>	PS	809	<i>Maria Veronica</i>	PS	1232
<i>Atun VII</i>	PS	751	<i>Maria W</i>	BB	102
<i>Atun VIII</i>	PS	751	<i>Mazatun</i>	PS	1482
<i>Atun X</i>	PS	778	<i>Mazcu I</i>	PS	240
<i>Audaz</i>	BB	90	<i>Mazpesca</i>	PS	410
<i>Azteca 1</i>	PS	1202	<i>Nair</i>	PS	1346
<i>Azteca 10</i>	PS	1627	<i>Nair II</i>	PS	1275
<i>Azteca 11</i>	PS	410	<i>Nair III</i>	PS	240
<i>Azteca 2</i>	PS	1274	<i>Neptuno</i>	PS	793
<i>Azteca 3</i>	PS	1524	<i>Ofelia</i>	BB	176
<i>Azteca 4</i>	PS	1278	<i>Olivia</i>	PS	145
<i>Azteca 5</i>	PS	1282	<i>Pastora</i>	PS	168
<i>Azteca 6</i>	PS	1283	<i>Tamara</i>	PS	490
<i>Azteca 7</i>	PS	1383	<i>Tatiana</i>	BB	97
<i>Azteca 8</i>	PS	1157	<i>Theresa Janene</i>	PS	1275
<i>Azteca 9</i>	PS	733	<i>Tizoc</i>	PS	180
<i>Bonnie</i>	PS	1277	<i>Tono I</i>	PS	115
<i>Cabo San Lucas</i>	PS	1478	<i>Tutankamon</i>	PS	784

TABLE 2. (continued)

TABLE 2. (continuación)

Flag and vessel name	Gear type	Capacity	Flag and vessel name	Gear type	Capacity
Bandera y nombre de buque	Tipe de arte	Capacidad	Bandera y nombre de buque	Tipe de arte	Capacidad
Nicaragua			Venezuela		
<i>Pamela Ann</i>	PS	1229	<i>Amazonas</i>	PS	1115
			<i>Calypso</i>	PS	1168
Panamá			<i>Canaima</i>	PS	1094
<i>Cervantes</i>	PS	775	<i>Carirubana</i>	PS	1137
<i>Don Alvaro</i>	PS	180	<i>Carmela</i>	PS	1241
<i>Don Luis</i>	PS	180	<i>Cayude</i>	PS	1274
<i>Geminis</i>	PS	255	<i>Conquista</i>	PS	1168
<i>Genesis I</i>	PS	586	<i>Falcon</i>	PS	1137
<i>Julie L</i>	PS	2056	<i>Jane</i>	PS	1242
<i>Mary Lynn (Mazcu IV)</i>	PS	285	<i>Jenny Margot II</i>	PS	1784
<i>Panama Tuna</i>	PS	3300	<i>Judibana</i>	PS	1231
<i>Raffaello</i>	PS	1104	<i>La Foca</i>	PS	1287
<i>San Marino I</i>	PS	796	<i>La Parrula</i>	PS	889
			<i>Los Roques</i>	PS	1262
El Salvador			<i>Lucile</i>	PS	1583
<i>Alexandros</i>	PS	1919	<i>Marinero</i>	PS	1244
<i>Montelucia</i>	PS	2550	<i>Napoleon</i>	PS	1250
			<i>Orinoco II</i>	PS	1581
USA—EE.UU.			<i>Sea Royal</i>	PS	1488
<i>Annie D</i>	PS	113	<i>Taurus I</i>	PS	1191
<i>Atlantis</i>	PS	1275	<i>Taurus Tuna</i>	PS	1175
<i>Bold Adventuress</i>	PS	1643	<i>Templario</i>	PS	1268
<i>Capt Vincent Gann</i>	PS	1643	<i>Ventuari</i>	PS	1542
<i>Connie Jean</i>	PS	584			
<i>Donna B</i>	PS	182	Vanuatu		
<i>Lady Elizabeth</i>	PS	337	<i>Esmeralda C</i>	PS	1358
<i>Mauritania</i>	PS	423	<i>Gold Coast</i>	PS	1194
<i>Santa Maria</i>	PS	102	<i>Mirelur</i>	PS	1360
<i>Sea Scout</i>	PS	180	<i>Tiuna</i>	PS	1202
<i>South Seas</i>	PS	1275			
<i>St George II</i>	PS	107			

TABLE 3. Changes in the IATTC fleet list recorded during the second quarter of 2001. PS = purse seine; BB = baitboat. UND = unidentified

TABLA 3. Cambios en la flota observada por la CIAT registrados durante el segundo trimestre de 2001. PS = cerquero; BB = buque de carnada. UND = no identificada

Vessel name	Flag	Gear	Size class	Capacity (m ³)	Remarks
Nombre del buque	Bandera	Arte	Clase de arqueo	Capacidad (m ³)	Comentarios
Vessels added to the fleet—Buques agregados a la flota					
<i>Macel II</i>	MEX	PS	5	490	New entry—1 ^{er} ingreso
<i>Tamara</i>	MEX	PS	5	490	New entry—1 ^{er} ingreso
Vessels changing name, flag, and/or size class—Buques de nombre, bandera, y/o clase cambiada					
<i>Betty C</i>	VUT	PS	6	814	Flag changed to—Ahora bandera: ECU
<i>Don Tampirio</i>	HND	PS	6	786	Flag changed to—Ahora bandera: UND
<i>Don Tampirio</i>	UND	PS	6	786	Flag changed to—Ahora bandera: HND
<i>Patricia Lynn</i>	BLZ	PS	4	270	Flag changed to—Ahora bandera: COL
<i>Don Italo</i>	BLZ	PS	5	456	Size class changed to 6 Tamaño cambiado a clase 6
<i>Cabo Tosco</i>	MEX	PS	3	250	Name changed to—Ahora: <i>Juan Pablo II</i>
<i>Maria Antonieta</i>	ECU	PS	3	144	Name changed to—Ahora: <i>José Antonio</i>
Vessel removed from the fleet—Buque retirado de la flota					
<i>Caroni</i>	VEN	PS	6	1,110	Sank—Se hundio

TABLE 4. Preliminary estimates of the catches of tunas in the EPO from January 1 through October 1, 2001, by species and vessel flag, in metric tons.

TABLA 4. Estimaciones preliminares de las capturas de atunes en el OPO del 1 de enero al 1 octubre de 2001, por especie y bandera del buque, en toneladas métricas.

Flag	Yellowfin		Skipjack	Bigeye	Bluefin	Bonito	Albacore	Black skipjack	Other ¹	Total	Percentage of total
	CYRA	Outside									
Bandera	Aleta amarilla		Barrilete	Patudo	Aleta azul	Bonito	Albacora	Barrilete negro	Otras ¹	Total	Porcentaje del total
	ARCAA	Exterior									
Ecuador	41,591	2,324	53,314	14,078	-	-	-	633	17	111,957	24.1
España-Spain	5,188	2,656	17,167	5,642	-	-	-	-	-	30,653	6.6
México	98,741	14,503	7,343	61	711	15	19	-	-	121,393	26.1
Panamá	9,684	770	5,682	1,613	-	-	-	-	3	17,752	3.8
U.S.A.-EE.UU.	4,028	1,141	3,706	1,765	143	-	-	60	-	10,843	2.3
Venezuela	79,450	6,122	1,358	-	-	-	-	-	-	86,930	18.7
Vanuatu	9,900	780	6,102	3,121	-	-	-	-	-	19,903	4.3
Other-Otros ²	37,247	4,835	17,517	6,188	-	-	-	44	-	65,831	14.1
Total	285,829	33,131	112,189	32,468	854	15	19	737	20	465,262	

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

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

² Includes Belize, Bolivia, Colombia, El Salvador, Guatemala, Honduras, Nicaragua, and undocumented. This category is used to avoid revealing the operations of individual vessels or companies.

² Incluye Belice, Bolivia, Colombia, El Salvador, Guatemala, Honduras, Nicaragua, y indocumentado. Se usa esta categoría para no revelar información sobre faenas de buques o empresas individuales.

TABLE 5. Report period (January 1-June 30) logged yellowfin catch in metric tons [C(L)], and catch per day's fishing¹ [C(L)/E(L)], by year, area, and gear type, based on fishing vessel logbook information.

TABLA 5. Captura registrada de aleta amarilla [C(R)], y captura por día de pesca¹ [C(R)/E(R)], por año, área y tipo de arte, en toneladas métricas, en el período del informe (1 de enero-30 de junio), basado en información de los cuadernos de bitácora de barcos pesqueros.

Gear and area Arte y área	Fishery statistic Estadística de pesca	Year-Año					
		1996	1997	1998	1999	2000	2001 ²
Purse seine	C(L)						
Red de cerco	C(R)	145,400	134,100	133,500	148,700	123,300	149,500
CYRA	C(L)/E(L)						
ARCAA	C(R)/E(R)	12.6	11.1	10.2	11.3	9.2	16.7
Outside ³	C(L)						
Exterior ³	C(R)	21,800	42,000	22,400	24,100	42,400	22,000
	C(L)/E(L)						
	C(R)/E(R)	8.6	12.4	6.8	13.6	14.1	15.2
EPO ⁴	C(L)						
OPO ⁴	C(R)	167,100	176,000	155,900	172,800	165,700	171,500
	C(L)/E(L)						
	C(R)/E(R)	11.9	11.4	9.5	11.6	10.1	16.5
Annual total	C(L)						
Total anual	C(R)	201,200	209,900	192,400	205,900	205,300	
Baitboat	C(L)						
Carnada	C(R)	2,400	3,100	2,500	1,100	1,400	1,700
	C(L)/E(R)						
	C(R)/E(R)	3.5	3.4	2.7	1.5	2.7	4.9
Annual total							
Total anual		2,800	3,500	2,600	1,600	2,100	

¹ Purse-seiners, class-6 only; all baitboats. The C(L) values are rounded to the nearest 100, and the C(L)/E(L) values to the nearest 0.1.

¹ Cerqueros de las clase 6; todos barcos de carnada. Se redondean los valores de C(R) al 100 más cercano, y los de C(R)/E(R) al 0.1 más cercano.

² Preliminary

² Preliminar

³ Includes the area west of the CYRA but east of 150°W

³ Incluye la zona al oeste del ARCAA al este de 150°O

⁴ Includes the Pacific Ocean east of 150°W

⁴ Incluye el Océano Pacífico al este de 150°O

TABLE 6. Report period (January 1- June 30) logged skipjack tuna catch in metric tons [C(L)] and catch per day's fishing¹ [C(L)/E(L)] in the EPO², by year and gear type, based on fishing vessel logbook information.

TABLA 6. Captura registrada de barrilete [C(R)], y captura por día de pesca¹ [C(R)/E(R)] en el OPO², por año y tipo de arte, en toneladas métricas, en el período del informe (1 de enero-30 de junio), basado en información de los cuadernos de bitácora de barcos pesqueros.

Gear Arte	Fishery statistic Estadística de pesca	Year—Año					
		1996	1997	1998	1999	2000	2001 ³
Purse seine	C(L)						
Red de cerco	C(R)	55,600	69,400	63,100	158,400	118,300	57,000
	C(L)/E(L)						
	C(R)/E(R)	4.0	4.5	3.9	10.6	7.2	5.5
Annual total	C(L)						
Total anual	C(R)	74,900	98,800	97,200	177,400	128,600	
Baitboat	C(L)						
Carnada	C(R)	1,400	1,700	900	1,600	100	100
	C(L)/E(L)						
	C(R)/E(R)	2.1	1.8	1.0	2.2	0.2	0.2
Annual total	C(L)						
Total anual	C(R)	1,800	2,300	1,000	1,800	100	

¹ Purse-seiners, class-6 only; all baitboats. The C(L) values are rounded to the nearest 100, and the C(L)/E(L) values to the nearest 0.1.

¹ Cerquero de la clase 6; todos barcos de carnada. Se redondean los valores de C(R) al 100 más cercano, y los de C(R)/E(R) al 0.1 más cercano.

² Includes the Pacific Ocean east of 150°W

² Incluye el Océano Pacífico al este de 150°W

³ Preliminary

³ Preliminar

TABLE 7. Report period (January 1- June 30) logged bigeye catch in the EPO¹ and catch per day of fishing (CPDF) in the EPO, in metric tons, based on logbook information from purse seiners.

TABLA 7. Captura registrada de atún patudo en el OPO¹ en el período del informe (1 de enero-30 de junio) y captura por día de pesca (CPDP) en el OPO, en toneladas métricas, basadas en información de las bitácoras de barcos cerqueros.

Fishery statistic—Estadística de pesca	Year—Año					
	1996	1997	1998	1999	2000	2001 ²
Catch—Captura	28,500	24,600	14,100	20,500	44,300	20,600
CPDF—CPDP	2.0	1.6	0.9	1.4	2.7	2.0
Total annual catch—Captura total anual	41,300	34,100	20,400	22,700	48,900	

¹ Includes the Pacific Ocean east of 150°W—Incluye el Océano Pacífico al este de 150°O

² Preliminary—Preliminar

TABLE 8. Preliminary data on the sampling coverage of trips by Class-6 vessels (capacity >363 metric tons) by the IATTC, Ecuadorian, Mexican, and Venezuelan programs during the third quarter of 2001. The numbers in parentheses indicate cumulative totals for the year.

TABLA 8. Datos preliminares de la cobertura de muestreo de viajes de barcos de la Clase 6 (capacidad >363 toneladas métricas) por los programas de la CIAT, Ecuador, México, y Venezuela durante el tercer trimestre de 2001. Los números en paréntesis indican totales acumulados para el año.

Fleet	Number of trips	Trips sampled by program						Percent sampled	
		IATTC		National		Total			
Flota	Número de viajes	Viajes muestreados por programa						Porcentaje muestreado	
		CIAT		Nacional		Total			
Belize—Belice	2 (5)	1	(4)			1	(4)	50.0	(80.0)
Bolivia	6 (17)	5 ¹	(6)	0	(2) ²	5	(8)	83.3	(47.1)
Colombia	7 (20)	7	(20)			7	(20)	100	(100)
Ecuador	40 (191)	28	(143)	12	(48)	40	(191)	100	(100)
España—Spain	8 (28)	8	(28)			8	(28)	100	(100)
Guatemala	7 (22)	7	(22)			7	(22)	100	(100)
Honduras	2 (9)	2	(9)			2	(9)	100	(100)
México	44 (143)	20	(71)	24	(72)	44	(143)	100	(100)
Nicaragua	1 (5)	1	(5)			1	(5)	100	(100)
Panamá	7 (20)	7	(20)			7	(20)	100	(100)
El Salvador	2 (7)	2	(7)			2	(7)	100	(100)
U.S.A.—EE.UU.	2 (16)	2	(16)			2	(16)	100	(100)
Venezuela	38 (115)	19	(58)	19	(57)	38	(115)	100	(100)
Vanuatu	6 (28)	6	(26)			6	(26)	100	(92.9)
Undocumented	0 (1)	0	(1)			0	(1)	100	(100)
Total	172 (627) ³	115	(436)	55	(179)	170	(615) ³	98.8	(98.1)

¹ Does not include a trip that was only partially observed by the IATTC

¹ No incluye un viaje sólo parcialmente observado por la CIAT

² Sampled by the Ecuadorian national observer program (PROBECUADOR)

² Muestreado por el programa nacional de observadores de Ecuador (PROBECUADOR)

³ Includes 54 trips that began in late 2000 and ended in 2001

³ Incluye 54 viajes iniciados a fines de 2000 y completados en 2001

TABLE 9. Longline catches of sharks, tunas, and billfishes recorded on research cruises in the eastern Pacific Ocean. The percentages of sharks, tunas, and billfishes were calculated by dividing the subtotals for those groups by the totals for the three groups combined.

TABLA 9. Capturas palangreras de tiburones, atunes, y peces picudos registrados en cruceros de investigación en el Océano Pacífico oriental. Se calculan los porcentajes de tiburones, atunes, y peces picudos dividiendo los subtotales de estos grupos por los totales de los tres grupos combinados.

	1953 ¹		1955 ²		1956 ²		1988 ³		1989 ³		1993 ⁴	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Sharks—Tiburones												
Blue—Azul							1,900		1,320		602	
Thresher—Zorro											929	
Mako—Marrajo							883		610		10	
Blacktip—Macuira											193	
Hammerhead—Cornuda							2				50	
Subtotal	236	58	307	53	143	41	2,785		1,930		1,784	81
Tunas—Atunes												
Bigeye—Patudo	16		89		43							
Yellowfin—Aleta amarilla	76		26		43						88	
Skipjack—Barrilete			2									
Subtotal	92	23	117	20	86	25					88	4
Billfishes—Picudos												
Swordfish—Pez espada			2								78	
Striped marlin—Marlín rayado			60		17						205	
Blue marlin—Marlín azul											4	
Black marlin—Marlín negro					2							
Sailfish—Pez vela			90		102						57	
Subtotal	78	19	152	26	121	35					344	16
Total	406		576		350		2,785		1,930		2,216	
Others—Otras	18		109		71		272		198			

¹ Calif. Fish Game, 41 (1): 91-98.

² Calif. Fish Game, 46 (2): 117-150.

³ Calif. Coop. Ocean. Fish. Inves., Rep., 35: 222-229.

⁴ Ciencias Marinas, 24 (2): 193-210.

TABLE 10. Oceanographic and meteorological data for the Pacific Ocean, April-September 2001. The values in parentheses are anomalies.

TABLA 10. Datos oceanográficos y meteorológicos del Océano Pacífico, abril-septiembre 2001. Los valores en paréntesis son anomalías.

Month--Mes	4	5	6	7	8	9
SST—TSM, 0°-10°S, 80°-90°W (°C)	26.4 (1.1)	23.8 (-0.5)	21.9 (-1.1)	21.0 (-0.8)	20.0 (-0.8)	19.2 (-1.2)
SST—TSM, 5°N-5°S, 90°-150°W (°C)	27.5 (0.1)	26.9 (-0.2)	26.3 (0.0)	25.4 (-0.2)	24.7 (-0.3)	24.3 (-0.6)
SST—TSM, 5°N-5°S, 120°-170°W (°C)	27.5 (-0.2)	27.6 (-0.2)	27.7 (0.2)	27.3 (0.2)	26.9 (0.2)	25.6 (-0.1)
SST—TSM, 5°N-5°S, 150W°-160°E (°C)	28.2 (-0.2)	28.6 (0.0)	28.8 (0.2)	29.1 (0.5)	28.9 (0.5)	29.1 (0.6)
Thermocline depth—Profundidad de la termoclina, 0°, 80°W (m)	25	25	35	40	40	40
Thermocline depth—Profundidad de la termoclina, 0°, 110°W (m)	25	40	50	50	60	50
Thermocline depth—Profundidad de la termoclina, 0°, 150°W (m)	150	140	130	130	140	150
Thermocline depth—Profundidad de la termoclina, 0°, 180°W (m)	160	150	150	180	150	180
Sea level—Nivel del mar, Baltra, Ecuador (cm)	183.8 (1.1)	182.0 (0.7)	178.4 (-1.0)	175.3 (-5.2)	173.8 (-3.9)	172.6 (-4.7)
Sea level—Nivel del mar, La Libertad, Ecuador (cm)	224.6 (-6.2)	222.3 (-10.2)	-	219.8 (-10.5)	215.0 (-12.6)	220.7 (-7.2)
Sea level—Nivel del mar, Callao, Perú (cm)	111.4 (-3.1)	108.2 (-5.1)	110.1 (-0.1)	103.7 (-6.4)	101.1 (-6.5)	93.2 (-12.8)
SOI—IOS	-0.1	-0.8	-0.1	-0.4	-1.0	0.2
SOI*—IOS*	2.83	2.19	4.40	-4.35	-1.56	3.14
NOI*—ION*	2.15	-0.36	1.35	0.61	0.01	-0.72

TABLE 11. Incidental mortalities of dolphins in 2001, to September 30, annual dolphin stock mortality limits, and percentages of the dolphin stock mortality limits used. (The total of the mortality limits for the individual stocks is 5,796 animals, but the Agreement on the International Dolphin Conservation Program specifies that the dolphin mortality limit for all stocks combined must not exceed 5,000 animals.)

TABLA 11. Mortalidades incidentales de delfines en 2001, hasta el 30 de septiembre, límites anuales de mortalidad de delfines por población, y los porcentajes de los límites usados. (El total de los límites de mortalidad por población individual es 5.796 animales, pero el Acuerdo sobre el Programa Internacional para la Conservación de los Delfines dispone que el límite de mortalidad para todas las poblaciones combinadas no puede superar 5.000 animales.)

Stock	Cumulative mortality	Mortality limit	Percent used
Stock	Mortalidad acumulativa	Límite de mortalidad	Porcentaje usado
Offshore spotted—Manchado de altamar			
Northeastern—Nororiental	536	648	82.7
Western and southern—Occidental y sureño	161	1,145	14.1
Spinner-Tornillo			
Eastern—Oriental	400	518	77.2
Whitebelly—Panza blanca	310	871	35.6
Common—Común			
Northern—Norteño	94	562	16.7
Central	165	207	79.7
Southern—Sureño	41	1,845	2.2
Others—Otros	6		
Unidentified—No identificados	102		
Total	1,815	5,000	36.3