INTER-AMERICAN TROPICAL TUNA COMMMISSION
COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

QUARTERLY REPORT—INFORME TRIMESTRAL

July-September 2008—Julio-Septiembre 2008

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The

QUARTERLY REPORT

July-September 2008

of the

INTER-AMERICAN TROPICAL TUNA COMMISSION

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

El

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de la

COMISIÓN INTERAMERICANA DEL ATÚN 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, Peru in 2002, Spain in 2003, the Republic of Korea in 2005, and Colombia in 2007. Canada withdrew from the IATTC in 1984.

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

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

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

On 17 June 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. This agreement introduced such novel and effective measures as Dolphin Mortality Limits (DMLs) for individual vessels and the International Review Panel to monitor the performance and compliance of the fishing fleet. On 21 May 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 15 February 1999. In 2007 the Parties to this agreement consisted of Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, the United States, Vanuatu, and Venezuela, and Bolivia, Colombia, and the European Union were applying it provisionally. These were "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." This agreement established Stock Mortality Limits, which are similar to DMLs except that (1) they apply to all vessels combined, rather than to individual vessels, and (2) they apply to individual stocks of dolphins, rather than to all stocks of dolphins combined. The IATTC provides the Secretariat for the International Dolphin Conservation Program (IDCP) and its various working groups and panels and coordinates the On-Board Observer Program and the Tuna Tracking and Verification System (both described later in this report).

At its 70th meeting, on 24-27 June 2003, the Commission adopted the Resolution on the Adoption of the Convention for the Strengthening of the Inter-American Tropical Tuna Commission Established by the 1949 Convention between the United States of America and the Republic of Costa Rica ("the Antigua Convention"). This convention will replace the original one 15 months after it has been ratified or acceded to by seven signatories that were Parties to the 1949 Convention on the date that the Antigua Convention was open for signature. It has been ratified or acceded to by Mexico on 14 January 2005, El Salvador on 10 March 2005, the Republic of Korea on 13 December 2005, the European Union on 7 June 2006, Nicaragua on 13 December 2006, Belize on 12 June 2007, Panama on 10 July 2007, France on 20 July 2007, and Japan on 11 July 2008.

To carry out its responsibilities, 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 appointed by the Director, who is directly responsible to the Commission.

The scientific program is now in its 58th 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 and Fishery Status Reports, also in the two languages.

SPECIAL ANNOUNCEMENT

Japan acceded to the IATTC "Antigua Convention" on 11 July 2008. That convention will enter into force 15 months after seven nations that were members of the IATTC on the date that it was open for signature (14 November 2003) have ratified or acceded to it. Six such nations, El Salvador, France, Japan, Mexico, Nicaragua, and Panama, have ratified or acceded to the Convention, as have the Republic of Korea (which is now a member of the IATTC), Belize, and the European Union. The following nations have signed the Convention, but not ratified or acceded to it: Costa Rica, Ecuador, Guatemala, Peru, the United States, and Venezuela (members of the IATTC before 14 November 2003), Canada (member of the IATTC from 1968 to 1984), and China (not a member of the IATTC).

MEETINGS

Dr. Alexandre Aires-da-Silva and Mr. Kurt M. Schaefer participated in a Workshop on Tagging Analysis on 26-27 June 2008 and the first meeting of the Working Party on Tagging Data Analysis on 30 June-4 July 2008, both at the headquarters of the Indian Ocean Tuna Commission (IOTC) in Victoria, Seychelles. Dr. Aires-da-Silva's travel expenses, and part of Mr. Schaefer's travel expenses, were paid by the IOTC.

Dr. Mark N. Maunder participated in the International Statistical Ecology Conference at the University of St. Andrews, Scotland, on 9-11 July 2008, where he gave a presentation entitled "Integrated Analysis in Fisheries Stock Assessment."

Dr. Mihoko Minami participated in the 24th International Biometric Conference in Dublin, Ireland, on 13-18 July 2008, where she gave a talk entitled "A New Feature Extraction Method for Very Non-Normal Data: Analysis of Multivariate Species-Size Data from a Tuna Purse-Seine Fishery." Dr. Cleridy E. Lennert-Cody is co-author of the manuscript on which this talk was based.

Dr. Mark N. Maunder participated in the Chilean Jack Mackerel Stock Assessment Workshop, sponsored by the Instituto de Fomento Pesquero of Chile, in Valparaíso, Chile, on 4-13 August 2008. His travel expenses were paid by Instituto de Fomento Pesquero.

Mr. Kurt M. Schaefer participated in the Fourth Regular Session of the Scientific Committee of the Western and Central Pacific Fisheries Commission (WCPFC) in Port Moresby, Papua New Guinea, on 11-22 August 2008, where he gave two presentations. The first was a description of the tuna fisheries in the eastern Pacific Ocean and the most recent stock assessments for yellowfin, skipjack, and bigeye tuna performed by the IATTC staff. The second, given at a meeting of the working group of the Pacific Tuna Tagging Project, was a summary of results for yellowfin and bigeye from recent tagging experiments conducted in the eastern Pacific Ocean. In addition, he participated in a working group meeting preceding the Scientific Committee meeting to discuss and revise a proposal prepared by the staffs of the Secretariat of the Pacific Community and the IATTC on a Pacific-wide investigation of the age, growth, and reproductive biology of bigeye tuna. His expenses were shared equally by the WCPFC and IATTC.

Messrs. Kurt M. Schaefer and Daniel W. Fuller participated at the Third International Biologging Science Symposium, held in Pacific Grove, California, on 1-5 September 2008. Mr. Schaefer gave a presentation, coauthored with Mr. Fuller and Dr. Barbara A. Block (Hopkins Marine Station, Stanford University) entitled "Geographic Variation in Horizontal and Vertical Movements of Yellowfin Tuna (*Thunnus albacares*) in the Eastern Pacific Ocean, Ascertained from Archival Tags."

Mr. Kurt M. Schaefer was an invited participant in the International Union for the Conservation of Nature (IUCN) Red List Workshop for Eastern Pacific Tuna and Billfish, which was hosted by the Instituto del Mar del Perú in Callao, Peru, on 10-12 September 2008. The workshop was convened by the Global Marine Species Assessment (GMSA), an initiative of the IUCN and Conservation International. The goal of the workshop was to "bring together regional

and international scientific experts to assess the conservation status and threats to extinction for approximately 23 species of eastern Pacific tuna and billfish, by applying the IUCN Red List criteria." Mr. Schaefer's travel expenses were paid by the GMSA.

DATA COLLECTION

The IATTC has field offices at Las Playas and Manta, Ecuador; Manzanillo and Mazatlan, Mexico; Panama, Republic of Panama; and Cumaná, Venezuela.

Personnel at these offices collected 276 length-frequency samples from 163 wells and abstracted logbook information for 262 trips of commercial fishing vessels during the third quarter of 2008.

Also during the third quarter members of the field office staffs placed IATTC observers on 110 fishing trips by vessels that participate in the AIDCP On-Board Observer Program. In addition, 103 IATTC observers completed trips during the quarter, and were debriefed by field office personnel.

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

Statistical data for purse-seine and pole-and-line vessels 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 purse-seine and pole-and line vessels that are fishing, or are expected to fish, in the eastern Pacific Ocean (east of 150°W; EPO) during 2008 is about 228,900 cubic meters (m^3) (Table 1). The weekly average at-sea capacity for the fleet, for the weekly periods ending 30 June through 28 September, was about 126,100 m^3 (range: 90,900 to 171,300 m^3). Data on the tuna fleet of the EPO are given in Table 2. The changes of flags and vessel names and additions to and deletions from the IATTC's fleet list during the third quarter of 2008 are given in Table 3.

Catch and catch-per-unit-of-effort statistics for the purse-seine and pole-and-line fisheries

Catch statistics

The estimated total retained catches of tunas in the EPO during the period of 1 January-28 September 2008, and the corresponding periods of 2003-2007, in metric tons, were:

Species	2008	2003-2007			Weekly average, 2008
		Average	Minimum	Maximum	
Yellowfin	154,100	213,300	142,400	325,000	4,000
Skipjack	234,600	174,700	132,200	207,400	6,000
Bigeye	48,000	33,200	23,600	43,600	1,200

Summaries of the preliminary estimated retained 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, skipjack, and bigeye are made by vessels with carrying capacities greater than 363 metric tons, and only data for such purse seiners are included herein for comparisons among years. There are now far fewer pole-and-line vessels than in previous years, so the data for these vessels are combined without regard to carrying capacity. There are no adjustments included for other factors, such as type of set or vessel operating costs and market prices, which might identify whether a vessel was directing its effort toward a specific species.

Preliminary estimates of the catches per unit of effort (CPUEs), expressed as catches per day's fishing, by purse seiners, of yellowfin (Table 5), skipjack (Table 6), and bigeye (Table 7) in the EPO during the first two quarters of 2008 and the corresponding periods of 2003-2007, in metric tons, were:

Species	Region	2008	2003-2007		
			Average	Minimum	Maximum
Yellowfin	N of 5° N	11.2	13.1	9.4	22.1
	S of 5° N	3.6	4.6	2.3	7.3
Skipjack	N of 5° N	2.3	2.7	2.1	3.7
	S of 5° N	13.4	8.6	6.5	11.0
Bigeye	EPO	2.8	1.8	1.5	2.0

Catch statistics for the longline fishery

The catches of bigeye by longline gear in the EPO during the first half and the third quarter of 2007 are shown in Table 8. Equivalent data are not available for the other species of tunas, or for billfishes.

Size compositions of the surface catches of tunas

Length-frequency samples are the basic source of data used for estimating the size and age compositions of the various species of fish in the landings. This information is necessary to obtain age-structured estimates of the population for various purposes, including the integrated modeling that the staff has employed during the last several years. The results of such studies have been described in several IATTC Bulletins, in its Annual Reports for 1954-2002, in its

Fishery Status Reports 1-5 (covering the years 2002-2006), and in its Stock Assessment Reports.

Length-frequency samples of yellowfin, skipjack, bigeye, Pacific bluefin, and, occasionally, black skipjack from the catches of purse-seine, pole-and-line, and recreational vessels in the EPO are collected by IATTC personnel at ports of landing in Ecuador, Mexico, Panama, the USA, and Venezuela. The catches of yellowfin and skipjack were first sampled in 1954, bluefin in 1973, and bigeye in 1975. Sampling has continued to the present.

The methods for sampling the catches of tunas are described in the IATTC Annual Report for 2000 and in IATTC Stock Assessment Report 4. Briefly, the fish in a well of a purse-seine or pole-and-line vessel are selected for sampling only if all the fish in the well were caught during the same calendar month, in the same type of set (floating-object, unassociated school, or dolphin), and in the same sampling area. These data are then categorized by fishery (Figure 1).

Data for fish caught during the second quarters of 2003-2008 are presented in this report. Two sets of length-frequency histograms are presented for each species; the first shows the data by stratum (gear type, set type, and area) for the second quarter of 2008, and the second shows data for the combined strata for the second quarter of each year of the 2003-2008 period. Samples from 326 wells were taken during the second quarter of 2008.

There are ten surface fisheries for yellowfin defined for stock assessments: four associated with floating objects, two unassociated school, three associated with dolphins, and one pole-and-line (Figure 1). The last fishery includes all 13 sampling areas. Of the 326 wells sampled that contained fish caught during the second quarter of 2008, 194 contained yellowfin. The estimated size compositions of these fish are shown in Figure 2a. The majority of the yellowfin catch during the second quarter was taken by sets on unassociated schools in the Northern and Southern areas, and on schools associated with dolphins in the Northern and Inshore areas. There were also small amounts of large yellowfin (120-160 cm) taken in schools associated with dolphins in the Southern area. Smaller amounts of yellowfin were taken in floating-object sets, primarily in the Northern and Equatorial areas.

The estimated size compositions of the yellowfin caught by all fisheries combined during the second quarters of 2003-2008 are shown in Figure 2b. The average weight of the yellowfin caught during the second quarter of 2008 (8.8 kg) was less than that of 2007 (10.8 kg), but greater than that of 2006 (7.1 kg) .

There are eight fisheries for skipjack defined for stock assessments: four associated with floating objects, two unassociated school, one associated with dolphins, and one pole-and-line (Figure 1). The last two fisheries include all 13 sampling areas. Of the 326 wells sampled that contained fish caught during the second quarter of 2008, 265 contained skipjack. The estimated size compositions of these fish are shown in Figure 3a. Large amounts of skipjack in the 40- to 50-cm range were caught in the Southern unassociated fishery during the second quarter. Also, significant amounts of skipjack were taken in the floating-object fisheries in the Northern, Equatorial, Inshore, and Southern areas. The majority of the skipjack caught during the second quarter in the floating-object fishery ranged between about 40 and 50 cm in length. Lesser amounts of larger skipjack (50-70 cm) were caught in all of the floating-object fisheries and in the Southern unassociated fishery.

The estimated size compositions of the skipjack caught by all fisheries combined during the second quarters of 2003-2008 are shown in Figure 3b. The average weight for the second quarter of 2008 (2.3 kg) was slightly less than that of 2007 (2.4 kg), but considerably greater than that of 2006 (1.8 kg).

There are seven surface fisheries for bigeye defined for stock assessments: four associated with floating objects, one unassociated school, one associated with dolphins, and one pole-and-line (Figure 1). The last three fisheries include all 13 sampling areas. Of the 326 wells sampled that contained fish caught during the second quarter of 2008, 102 contained bigeye. The estimated size compositions of these fish are shown in Figure 4a. The majority of the catch was taken in floating-object sets in the Northern, Equatorial, and Southern areas. Small amounts of bigeye were taken in the Inshore floating-object and unassociated fisheries.

The estimated size compositions of the bigeye caught by all fisheries combined during the second quarters of 2003-2008 are shown in Figure 4b. The average weight of bigeye during the second quarter of 2008 (8.7 kg) was greater than those of any of the previous five years.

The estimated retained purse-seine catch of bigeye less than 60 cm in length during the first two quarters of 2008 was 7,605 metric tons (t), or about 16 percent of the estimated total retained purse-seine catch of bigeye during that period. The corresponding amounts for the first two quarters of 2000-2007 ranged from 1,997 to 20,392 t, or 4 to 47 percent. These values may differ slightly from those given in previous Quarterly Reports due to changes in the estimation procedure.

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 Colombia, Ecuador, the European Union, Mexico, Nicaragua, Panama, and Venezuela. The observers are biologists trained to collect a variety of data on the mortalities of dolphins associated with the fishery, sightings of dolphin herds, catches of tunas and bycatches of fish and other animals, oceanographic and meteorological data, and other information used by the IATTC staff to assess the conditions of the various stocks of dolphins, study the causes of dolphin mortality, and assess the effect of the fishery on tunas and other components of the ecosystem. The observers also collect data relevant to compliance with the provisions of the AIDCP, and data required for the tuna-tracking system established under the AIDCP, which tracks the "dolphin-safe" status of tuna caught in each set from the time it is captured until it is unloaded (and, after that, until it is canned and labeled).

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 for which the Director determines that the use of an observer

from the AIDCP On-Board Observer Program is not practical.

In 2008 the observer programs of Colombia, the European Union, Mexico, Nicaragua, Panama, 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 preceding paragraph, the IATTC is to cover all trips by vessels registered in other nations that are required to carry observers.

Observers from the On-Board Observer Program departed on 110 fishing trips aboard purse seiners covered by that program during the third quarter of 2008. Preliminary coverage data for these vessels during the quarter are shown in Table 9. In the IATTC Quarterly Reports for January-March and April-June 2008, it was reported that the Program is placing observers aboard a vessel of less that 364 metric tons capacity, as required by AIDCP Resolution A-02-01, which was adopted at the eighth meeting of the Parties to the AIDCP on 10 October 2002. The government of the nation in which the vessel is registered determined that it is no longer required to carry IDCP observers, and its last fishing trip with an observer ended in July 2008.

Training

There were no IATTC observer training courses during the quarter.

RESEARCH

Early life history studies

Yellowfin broodstock

The yellowfin broodstock in Tank 1 (1,362,000 L) at the Achotines Laboratory spawned daily during the quarter. Spawning occurred between 9:50 p.m. and 10:40 p.m. The numbers of eggs collected after each spawning event ranged from about 71,000 to 1,169,000. The water temperatures in the tank ranged from 27.6° to 28.9°C during the quarter. At the end of September there were seven 41- to 61-kg yellowfin tuna in Tank 1

From January 2003 through July 2005 archival tags had been implanted in yellowfin tuna (IATTC Quarterly Reports for January-March 2003, April-June 2004, October-December 2004, and July-September 2005), and at the end of September one fish from those groups remained in Tank 1. In late January 2007 10 yellowfin (4 to 10 kg) held in the 170,000-L reserve broodstock tank (Tank 2) were implanted with prototype archival tags and transferred to Tank 1. At the end of September, three of the January 2007 group, bearing archival tags, remained in Tank 1.

Tank 2 held 19 fish and Tank 5 held 4 fish at the end of the quarter. On 24 September 2008, archival tags were implanted into six of the fish in Tank 2. One of these died the next day, but the other five were feeding well at the end of the month.

During September, Georgia Aquarium (GAQ) personnel worked with the Achotines Laboratory staff on mock transport trials of live tuna to test the feasibility of land and air shipment from Panama to the GAQ. They used three 2.3-m diameter tanks filled to 50-percent

capacity with 1500 L of seawater. Using 13 yellowfin tuna, ranging from about 42 to 77 cm in length, they carried out trials over three days, with different numbers and sizes of fish in each tank, and also trials at ambient and reduced temperatures. They also simulated air freight shipments with tanks that were unattended (standard air freight) and attended by technicians (charter flight). The results were positive, and the GAQ team will carry out data analysis and discussions with the staff at the GAQ to decide on how to proceed with further cooperative studies.

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 spotted rose snappers (*Lutjanus guttatus*) is carried out by the Autoridad de los Recursos Acuáticos de Panamá (ARAP).

During the second quarter two existing populations of mature pargos, totaling 30 fish, were combined in Tank 3 (85,000 L). During the third quarter, 10 of the fish died, and the survivors spawned on only two occasions during the quarter.

A new population of 43 mature pargos is being raised in Tank 4 (85,000 L). These fish have not yet spawned.

Visitors at the Achotines Laboratory

Four teachers and 12 students from Sage Hill School, Newport Coast, California. USA, spent the period of 4-14 August 2008, at the Achotines Laboratory, where they visited sites in and around Achotines Bay and the local area as part of a field biology summer course.

Mr. David Combosch, a graduate student at the Marine Science Center, Northeastern University, Nahant, Massachusetts, USA, spent the period of 17-23 August 2008 at the Achotines Laboratory, where he tagged and sampled *Pocillopora* coral colonies from Achotines Bay to genotype them.

Mr. John Wilk, a graduate student at the University of Illinois at Chicago, who is working with the Field Museum of Natural History in Chicago, spent the period of 17-23 August 2008 at the Achotines Laboratory, where he collected specimens for his project on the evolution of adaptation, using ecophenotypic responses in geminate species pairs of the genus *Isognomon* (Bivalvia).

Representatives of the Georgia Aquarium (GAQ), Atlanta, Georgia, USA, visited the Achotines Laboratory in April 2008 and a Memorandum of Understanding was signed by Dr. Guillermo A. Compeán and Mr. Mike Leven, Executive Director of the GAQ in June 2008. During 21-25 September 2008, Mr. Chris Coco (Manager-Husbandry), Dr. Alistair Dove

(Manager of Laboratory Services-Veterinary Services and Conservation Medicine), and Mr. Akira Kanezaki (Assistant Manager-Animal Acquisitions) of the GAQ worked with the Laboratory staff, carrying out the mock transport trials of live tuna described above.

Dr. Yoshifuma Sawada of the Fisheries Laboratory, Graduate School of Agriculture, Kinki University, Japan, visited the La Jolla office of the IATTC on 25-26 September 2008. During his visit, Dr. Sawada met with Dr. Guillermo A. Compeán, Mr. Brian S. Hallman, Dr. Richard B. Deriso, and members of the IATTC's early life history group to discuss potential collaborative research on the reproductive biology and early life history of yellowfin and bluefin tuna.

Oceanography and meteorology

Easterly surface winds blow almost constantly over northern South America, which cause 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 tropical eastern Pacific Ocean (EPO). 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. Two additional indices, the NOI* (Progress Ocean., 53 (2-4): 115-139) and the SOI*, have recently been devised. The NOI* is the difference between the anomalies of sea-level atmospheric pressure at the North Pacific High (35°N-130°W) and Darwin, Australia, and the SOI* is the difference between the anomalies of sea-level atmospheric pressure at the South Pacific High (30°S-95°W) and Darwin. Ordinarily, the NOI* and SOI* values are both negative during El Niño events and positive during anti-El Niño events.

During July 2007 there was a narrow strip of cool water extending westward along the equator from the coast to about 135°W and southward along the coast of South America to about 50°S and a small area of cool water centered at about 20°N-135°W. In August the strip of cool water became wider, and the small area of cool water moved northwestward to about 40°N-140°W. In September the strip of cool water was not quite as wide as it had been in August, but it extended westward to about 160°W (IATTC Quarterly Report for July-September 2007: Figure 5). The area of cool water along the equator and off the coast of northern South American persisted throughout the fourth quarter (IATTC Quarterly Report for October-December 2007: Figure 6). Also, a small area of cool water appeared off Baja California in October, and persisted throughout the fourth quarter. There were some areas of warm water west of 170°W and south of 15°S during October and November, but these had disappeared by December. An area of warm water that had existed north and northwest of the Hawaiian Islands during the fourth quarter of 2007 persisted throughout the first and second quarters of 2008, but disappeared after that. Another area of warm water appeared south of 20°S between about 90° and 140°W in January 2008, and moved westward during the subsequent months. An area of

warm water appeared off South America south of 20°S in February, increased in size in March (IATTC Quarterly Report for January-March 2008: Figure 8), and then decreased in size and eventually disappeared by June (IATTC Quarterly Report for April-June 2008: Figure 8). Meanwhile, the area of cool water that had extended along the equator from the coast of South America to as far west as 180° during most of 2007 began to dissipate. However, the small area of cool water that was noted off Baja California in December expanded westward in January, connecting with the area of cool water along the equator, and that connection persisted in February and March (IATTC Quarterly Report for January-March 2008: Figure 8). This area of cool water gradually dissipated during the second quarter of 2008, and was confined to waters north of 5°N by June (IATTC Quarterly Report for April-June 2008: Figure 8). The small area of warm water that had appeared along the equator east of 100°W in March (IATTC Quarterly Report for January-March 2008: Figure 8) persisted throughout the second and third quarters. It extended as far west as about 150°W in July, but had retreated to about 115°W by September (Figure 5). The data in Table 10 indicate that nearly normal conditions were in effect during the third quarter, with no SST anomalies exceeding -0.04 or +1.1. According to the Climate Diagnostics Bulletin of the U.S. National Weather Service for September 2008, "… neutral conditions are expected to continue into early 2009."

GEAR PROGRAM

The IATTC staff did not participate in any dolphin safety-gear inspections or safety-panel alignment procedures aboard purse seiners during the third quarter.

COLLECTION OF AT-SEA AND SUPPLEMENTAL RETAINED CATCH DATA FOR SMALL PURSE SEINERS

The U.S. National Oceanic and Atmospheric Administration has awarded the IATTC a contract to place observers, on a voluntary basis, on sufficient numbers of trips of "Class-5" purse seiners (vessels with carrying capacities of 273-363 metric tons) based in ports on the Pacific Coast of Latin America to obtain data on "catch, bycatch, interaction with protected species, and gear" for 1,000 days at sea per year and to "sample 100 percent of the in-port unloadings of Class 4-5 purse seine vessels [vessels with well capacities of 182-363 metric tons]." If that is not possible, observers can be placed on sufficient numbers of trips of Class-3 and/or -4 vessels (vessels with well capacities of 92-272 metric tons) to bring the total numbers of days at sea observed to 1,000.

No observers were placed on vessels during the third quarter. The numbers of trips completed, numbers of samples taken, and numbers of fish sampled were as follows:

Month	Trips completed	Samples taken	Fish sampled		
			Yellowfin	Skipjack	Bigeye
July	22	19	4,954	1,150	300
August	19	17	4,412	1,100	135
September	13	12	3,828	750	200
Total	54	48	13,194	3,000	635

INTER-AGENCY COOPERATION

Dra. Noemi Bocanegra, a recent graduate of the Centro Interdisciplinario de Ciencias Marinas, La Paz, Mexico, spent the period of 21-29 July 2008 at the IATTC headquarters in La Jolla. During her visit, Dra. Bocanegra worked with Dr. Robert J. Olson and Ms. Leanne M. Duffy to incorporate into the IATTC's diet data base her data on diet composition of tunas and several pelagic predator fishes caught in the purse-seine fishery. Dra. Bocanegra's data were obtained from specimens collected by IATTC observers on Ecuadorian and Mexican vessels during 2003 and 2004, and IATTC personnel in those two countries are acknowledged for their important role in the trophic ecology project.

Dr. Shane P. Griffiths, a research scientist with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) of Cleveland, Queensland, Australia, began a 3-month visit to the IATTC headquarters in La Jolla on 29 September 2008. He will work with Dr. Robert J. Olson, Ms. Leanne M. Duffy, and two scientists of the U.S. National Marine Fisheries Service, La Jolla, on aspects of trophic ecology and food-web models.

PUBLICATIONS

IATTC

IATTC. 2008. Workshop on turtle bycatch mitigation for longline fisheries: experimental design and data analysis. Inter-Amer. Trop. Tuna Comm., Spec. Rep., 17: 48 pp.

Outside journals

Kleiber, Pierre, and Mark N. Maunder. 2008. Inherent bias in using aggregate CPUE to characterize abundance of fish species assemblages. Fish. Res., 93 (1-2): 140-145.

Maunder, M. N. 2008. Maximum sustainable yield. *In* Jørgensen, Sven Erik, and Brian D. Fath (Editors in Chief), Encyclopedia of Ecology, Volume 3. Elsevier, Oxford: 2292-2296.

Maury, Olivier, Patrick Lehodey, Alverto Garcia, Francis Marsac, Robert Olson, Jock Young, Raghu Murtugudde, and Kathleen Miller. 2008. The first CLIOTOP symposium: an overview. GLOBEC International Newsletter, 14 (1): 59-63.

ADMINISTRATION

Mr. Ricardo de Ycaza, a graduate of the College of Charleston, Charleston, South Carolina, USA, was hired as a staff biologist at the Achotines Laboratory on 9 July 2008, replacing Ms. Aidamalia Vargas, who had resigned in July 2007.

Mr. Roberto Uriarte, who has provided technical support for the Tuna-Dolphin Program since 2004, began to assist Mr. Milton F. Lopez with maintenance of the IATTC computer network on 25 August 2009. (He is working part time on the computer network and part time providing technical support for the Tuna-Dolphin Program.)

Dr. Sheng-Ping Wang, Assistant Professor, Department of Environment Biology and Fisheries Science, National Taiwan Ocean University, spent the period of 1 July-30 September 2008, at the IATTC headquarters in La Jolla, where he worked with:

Drs. Mark N. Maunder, Alexandre Aires-da-Silva, and William H. Bayliff on a manuscript entitled “Impact of the Taiwanese longline fishery on bigeye tuna (*Thunnus obesus*) in the eastern Pacific Ocean”;

Drs. Mark N. Maunder and Alexandre Aires-da-Silva on a manuscript entitled “Implications of model and data assumptions: an illustration including Taiwanese data into the eastern Pacific Ocean bigeye tuna (*Thunnus obesus*) assessment”;

Dr. Mark N. Maunder on a manuscript entitled “Application of an age-structured assessment model to swordfish, *Xiphias gladius*, in the Indian Ocean.”

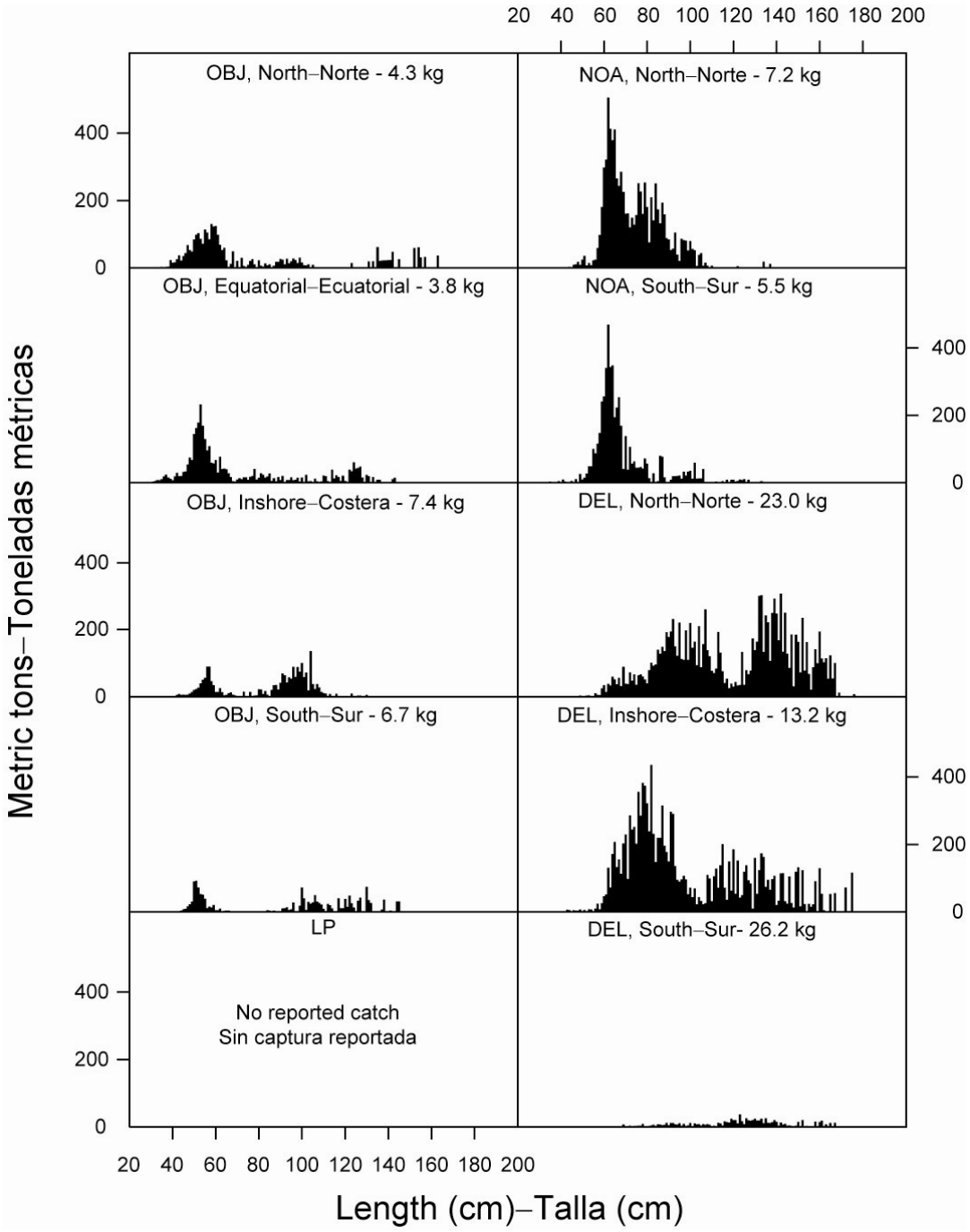

FIGURE 2a. Estimated size compositions of the yellowfin caught in each fishery of the EPO during the second quarter of 2008. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin.

FIGURA 2a. Composición por tallas estimada para el aleta amarilla capturado en cada pesquería del OPO durante el segundo trimestre de 2008. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caño; NOA = unassociated; DEL = delfín.

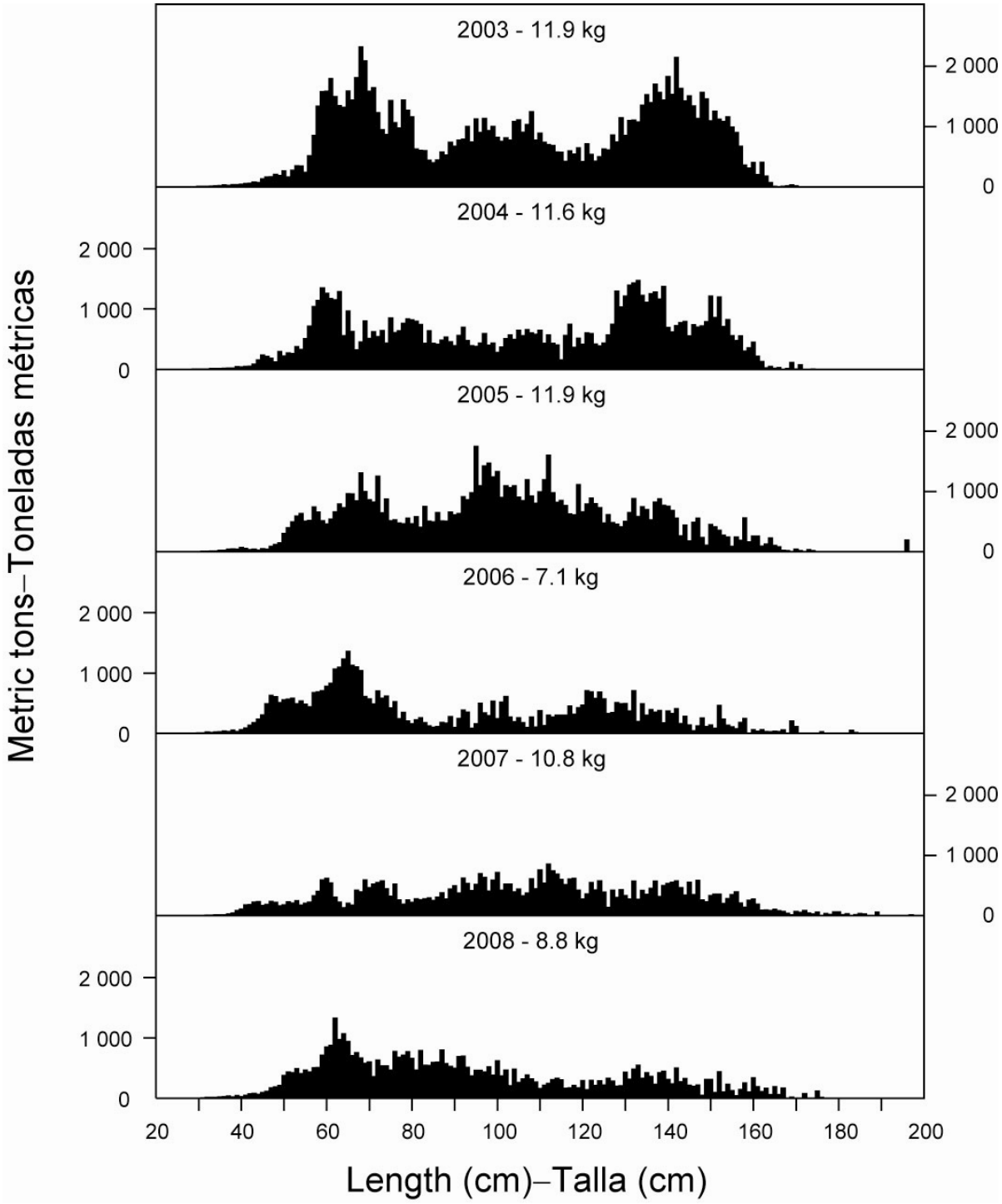

FIGURE 2b. Estimated size compositions of the yellowfin caught in the EPO during the second quarter of 2003-2008. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 2b. Composición por tallas estimada para el aleta amarilla capturado en el OPO en el segundo trimestre de 2003-2008. En cada recuadro se detalla el peso promedio de los peces en las muestras.

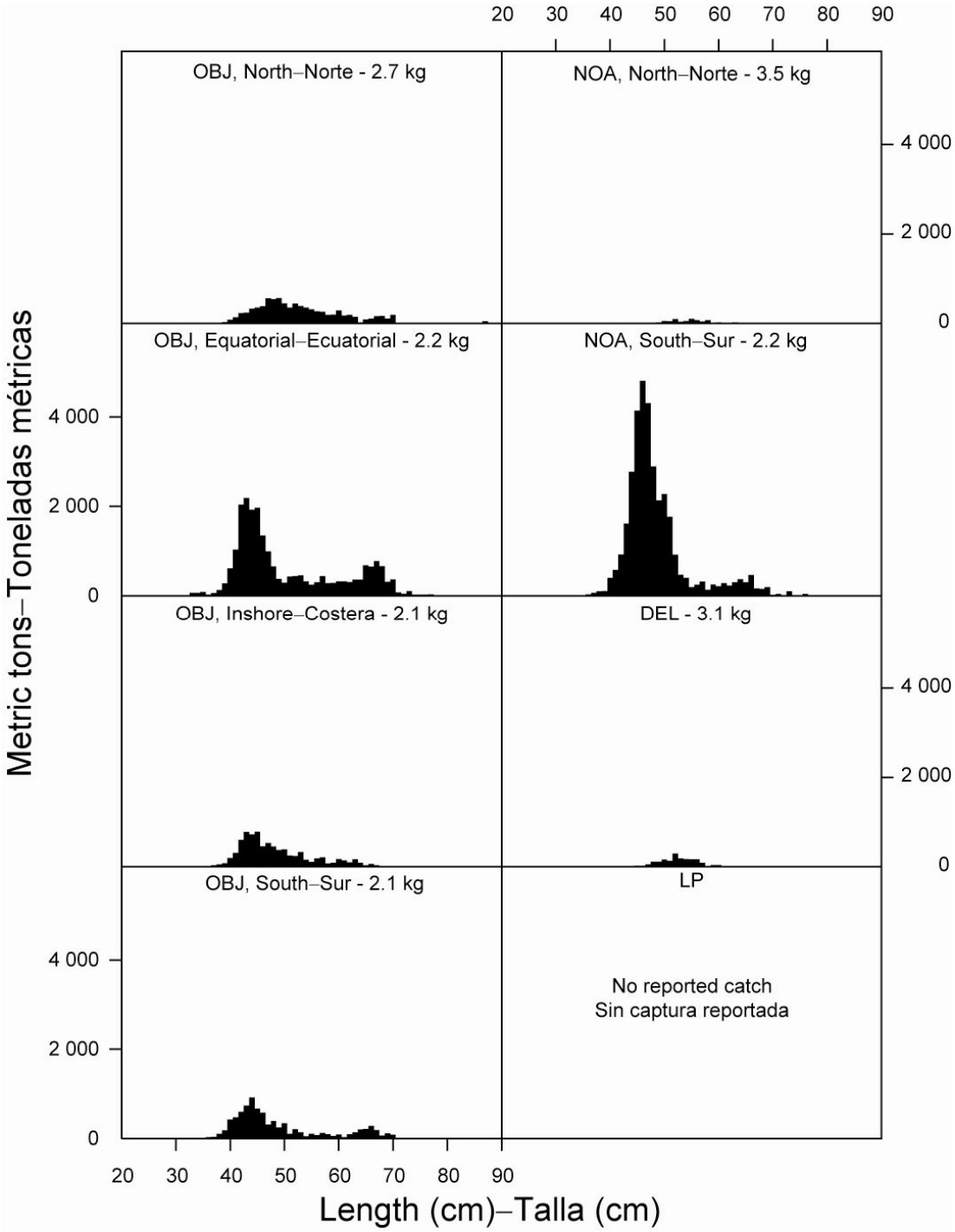

FIGURE 3a. Estimated size compositions of the skipjack caught in each fishery of the EPO during the second quarter of 2008. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin.

FIGURA 3a. Composición por tallas estimada para el barrilete capturado en cada pesquería del OPO durante el segundo trimestre de 2008. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caño; NOA = unassociated; DEL = delfín.

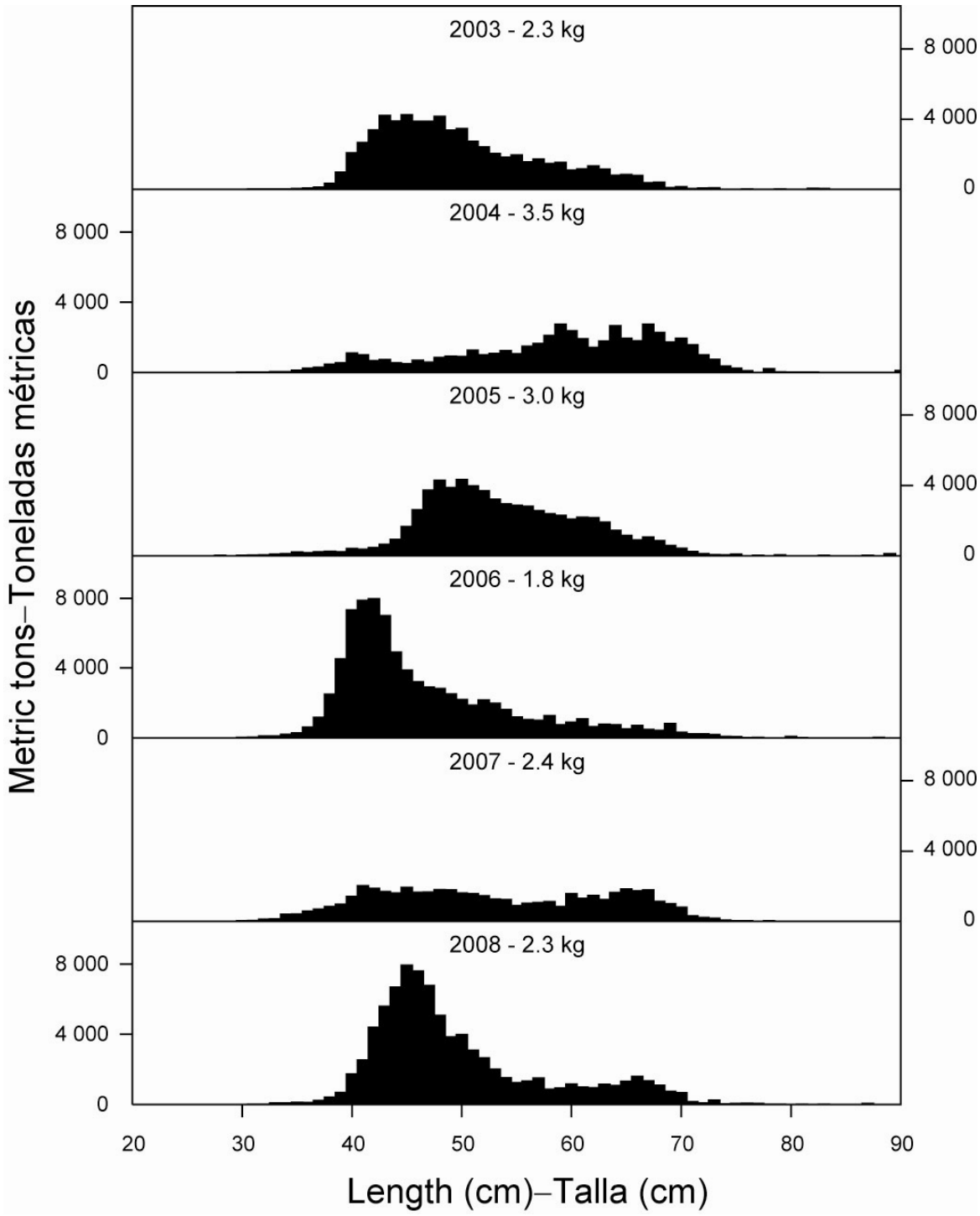

FIGURE 3b. Estimated size compositions of the skipjack caught in the EPO during the second quarter of 2003-2008. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 3b. Composición por tallas estimada para el barrilete capturado en el OPO en el segundo trimestre de 2003-2008. En cada recuadro se detalla el peso promedio de los peces en las muestras.

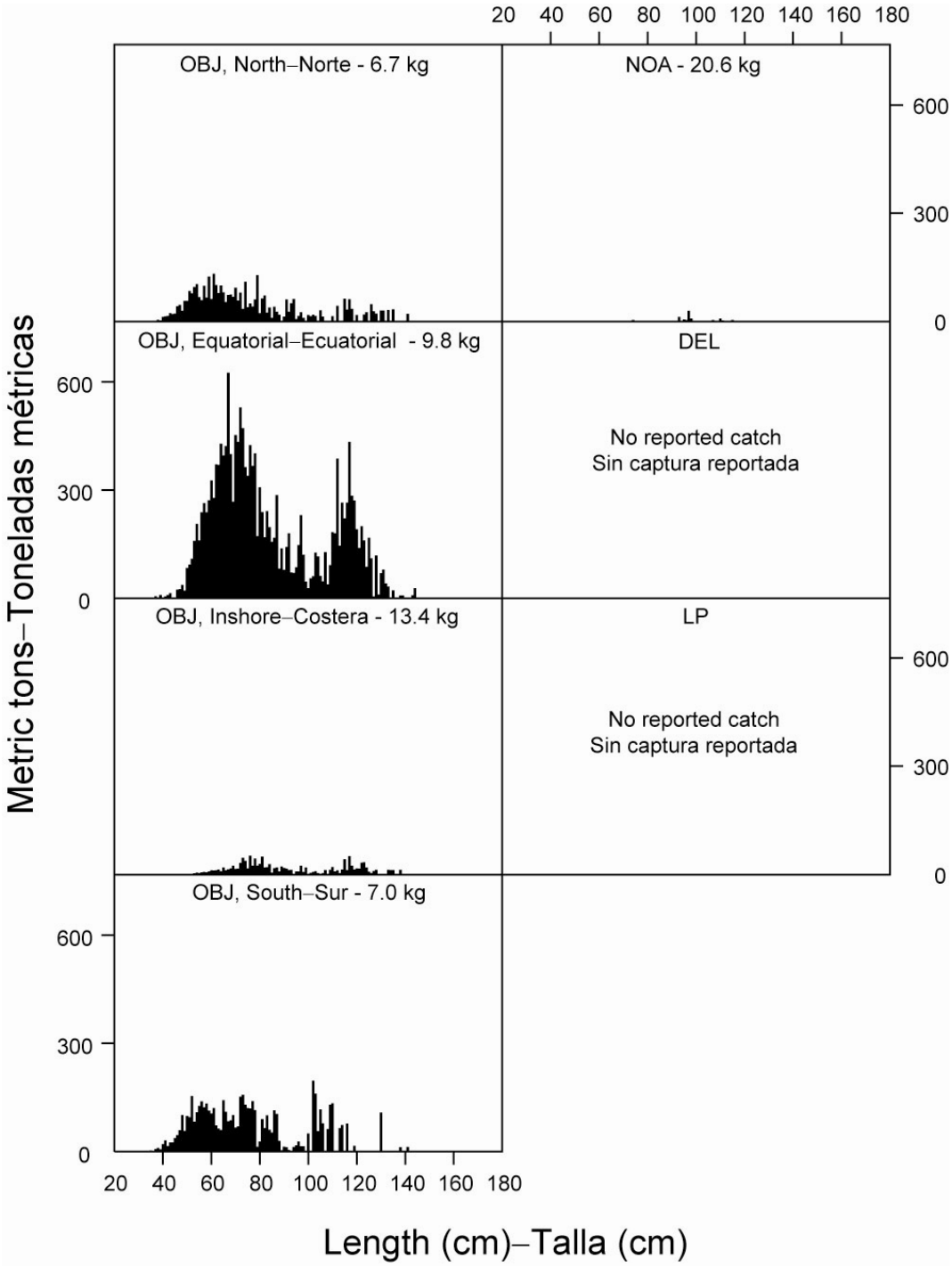

FIGURE 4a. Estimated size compositions of the bigeye caught in each fishery of the EPO during the second quarter of 2008. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin.

FIGURA 4a. Composición por tallas estimada para el patudo capturado en cada pesquería del OPO durante el segundo trimestre de 2008. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caño; NOA = unassociated; DEL = delfín.

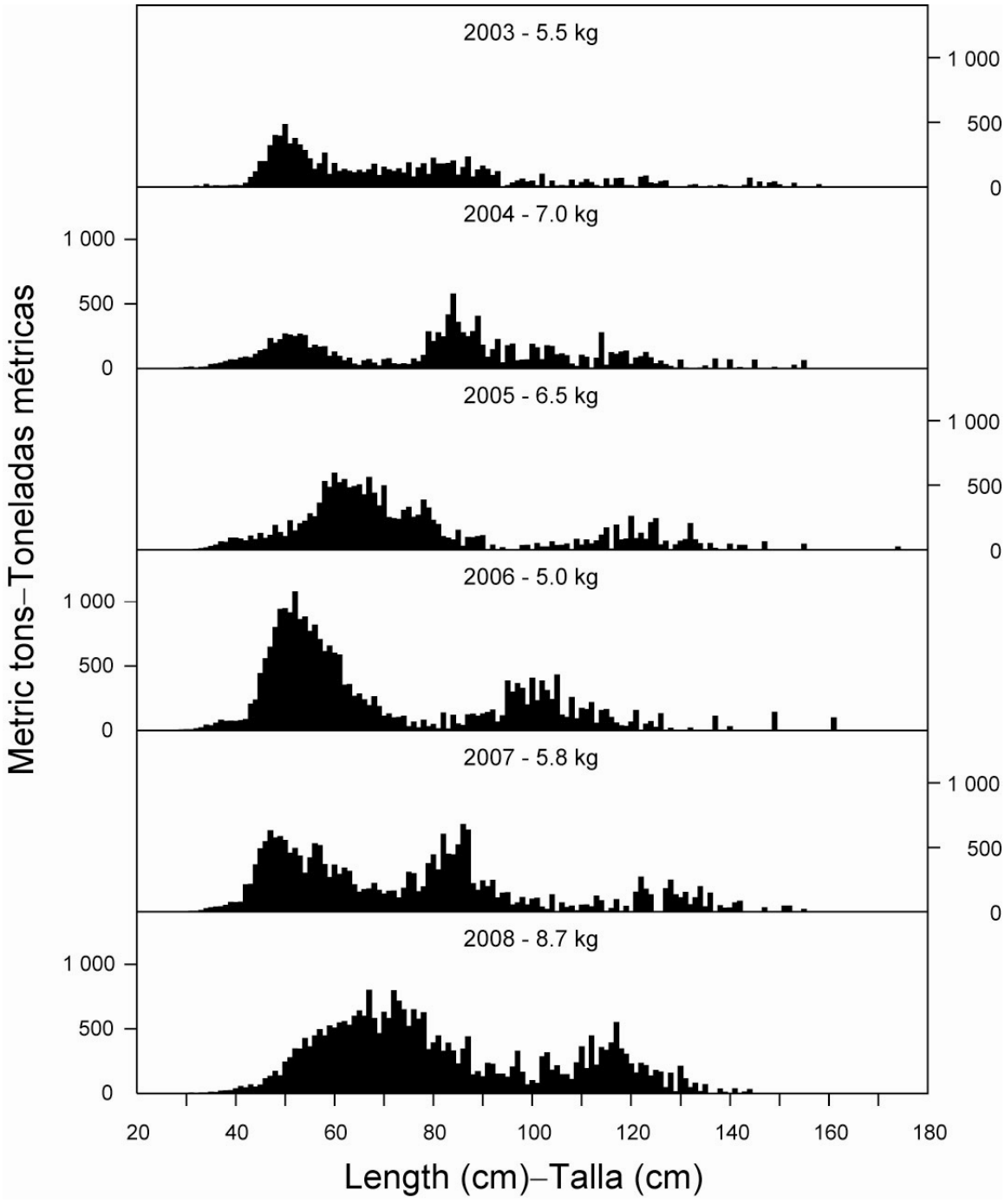

FIGURE 4b. Estimated size compositions of the bigeye caught in the EPO during the second quarter of 2003-2008. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 4b. Composición por tallas estimada para el patudo capturado en el OPO en el segundo trimestre de 2003-2008. En cada recuadro se detalla el peso promedio de los peces en las muestras.

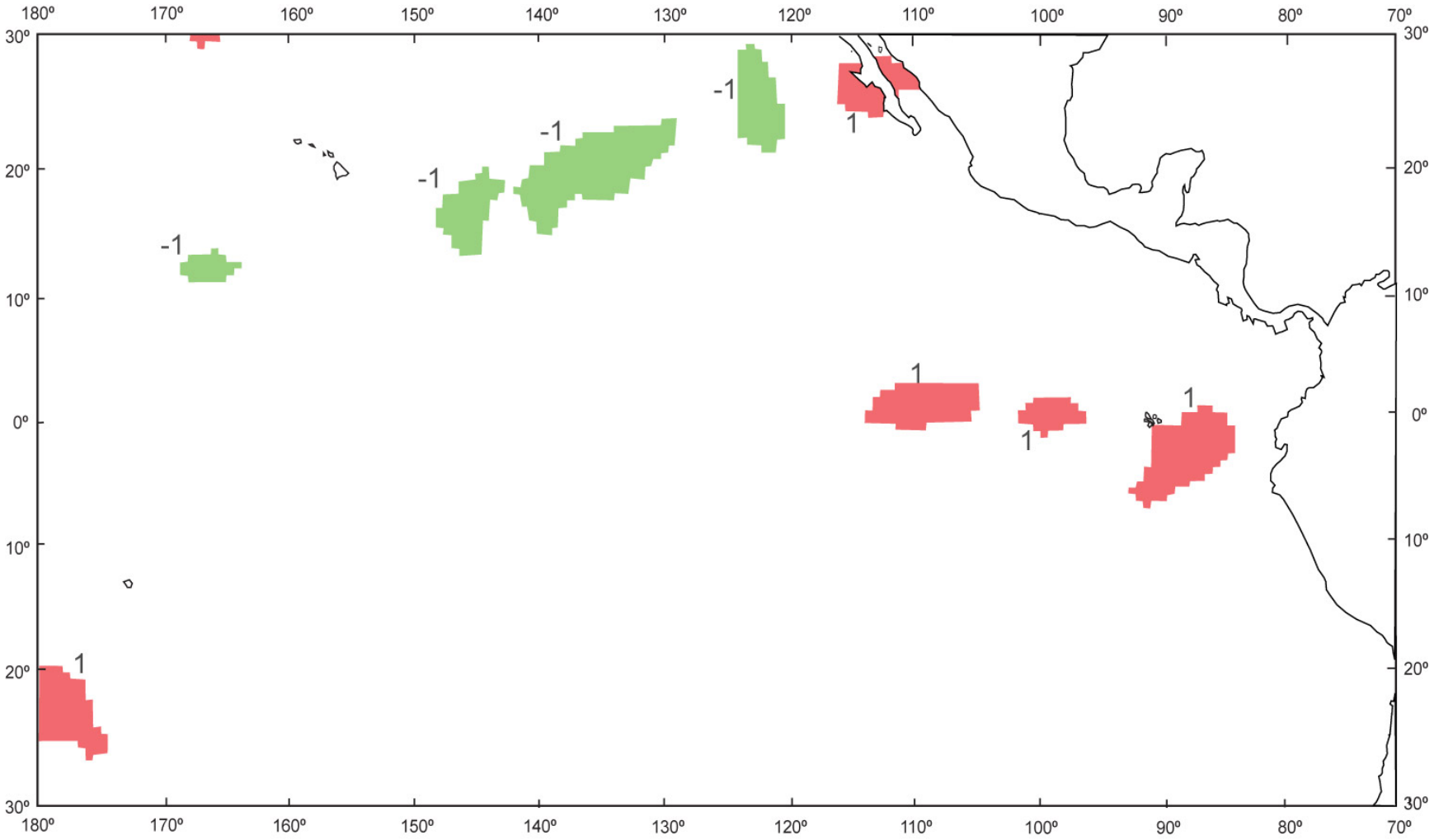

FIGURE 5. Sea-surface temperature (SST) anomalies (departures from long-term normals) for September 2008, based on data from fishing boats and other types of commercial vessels.
FIGURA 5. Anomalías (variaciones de los niveles normales a largo plazo) de la temperatura superficial del mar (TSM) en septiembre de 2008, basadas en datos tomados por barcos pesqueros y otros buques comerciales.

TABLE 1. Preliminary estimates of the numbers and capacities, in cubic meters, of purse seiners and pole-and-line vessels operating in the EPO in 2008 by flag, gear, and well volume. Each vessel is included in the totals for each flag under which it fished during the year, but is included only once in the fleet total. Therefore the totals for the fleet may not equal the sums of the individual flag entries. PS = purse seine; LP = pole-and-line.

TABLA 1. Estimaciones preliminares del número de buques cerqueros y cañeros que pescan en el OPO en 2008, y de la capacidad de acarreo de los mismos, en metros cúbicos, por bandera, arte de pesca, y volumen de bodega. Se incluye cada buque en los totales de cada bandera bajo la cual pescó durante el año, pero solamente una vez en el total de la flota; por consiguiente, los totales de las flotas no son siempre iguales a las sumas de las banderas individuales. PS = cerquero; LP = cañero.

Flag Bandera	Gear Arte	Well volume–Volumen de bodega				Capacity Capacidad
		1-900	901-1700	>1700	Total	
			Number—Número			
Bolivia	PS	1	-	-	1	222
Colombia	PS	5	10	-	15	15,110
Ecuador	PS	60	15	9	84	60,518
España—Spain	PS	-	-	3	3	6,955
Guatemala	PS	-	2	-	2	3,056
Honduras	PS	2	1	-	3	1,700
México	PS	22	33	1	56	55,893
	LP	4	-	-	4	380
Nicaragua	PS	-	5	-	5	6,023
Panamá	PS	5	18	5	28	36,966
Perú	PS	1	-	-	1	542
El Salvador	PS	-	1	3	4	7,415
USA—EE.UU.	PS	1	1	-	2	1,481
Venezuela	PS	-	20	2	22	30,629
Vanuatu	PS	1	2	-	3	3,609
Unknown— Desconocida	PS	1	-	-	1	209
All flags— Todas banderas	PS	98	107	23	228	
	LP	4	-	-	4	
	PS + LP	102	107	23	232	
			Capacity—Capacidad			
All flags— Todas banderas	PS	42,743	137,019	48,735	228,497	
	LP	380	-	-	380	
	PS + LP	43,123	137,019	48,735	228,877	

TABLE 2. Eastern Pacific Ocean surface fleet, by flag, vessel name, gear type (PS = purse seine; LP = pole-and-line), and cubic meters of fish-carrying capacity, as of 28 September 2008.
TABLA 2. La flota atunera de superficie del Océano Pacífico oriental, por bandera, nombre del barco, tipo de arte (PS = cerquero; LP = cañero), y metros cúbicos de capacidad de acarreo de pescado, hasta el 28 de septiembre de 2008.

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**
Bolivia			**Ecuador (cont.)**		
Mar Cantabrico	PS	222	*Elizabeth Cinco*	PS	1,265
			Elizabeth F	PS	755
Colombia			*Fernandito*	PS	147
Amanda S	PS	1,480	*Fiorella L*	PS	390
American Eagle	PS	1,272	*Gabriela A*	PS	420
Cabo De Hornos	PS	729	*Gema Del Mar*	PS	96
Dominador I	PS	421	*Gloria A*	PS	699
El Dorado	PS	390	*Gloria C*	PS	248
El Rey	PS	1,152	*Guayatuna Dos*	PS	1,881
Enterprise	PS	1,274	*Guayatuna Uno*	PS	1,881
Grenadier	PS	1,176	*Ignacio Mar I*	PS	370
Maria Isabel C	PS	1,193	*Ile Aux Moines*	PS	818
Marta Lucia R.	PS	1,603	*Ingalapagos*	PS	285
Nazca	PS	1,451	*Isabel Victoria VI*	PS	493
Patricia Lynn	PS	270	*Jacobita*	PS	374
Sandra C	PS	1,175	*Joselito*	PS	91
Sea Gem	PS	1,274	*Julia D*	PS	1,419
			Killa	PS	399
Ecuador			*Lizi*	PS	1,038
Alejandra	PS	464	*Ljbuica M.*	PS	275
Alessia	PS	399	*Lucia T*	PS	738
Alize	PS	688	*Lucy*	PS	245
Amalis	PS	217	*Malula*	PS	849
Andrea	PS	267	*Maria Fatima*	PS	338
Balbina	PS	217	*Maria Isabel*	PS	276
Betty C	PS	1,010	*Mariajosé*	PS	1,040
Betty Elizabeth	PS	290	*Mariella*	PS	1,041
Cap. Berny B.	PS	1,269	*Mary Lynn*	PS	250
Carmen D	PS	490	*Medjugorje*	PS	843
Cesar V	PS	335	*Milagros A*	PS	1,581
Charo	PS	2,023	*Miriam*	PS	176
Chasca	PS	399	*Miry Ann D*	PS	497
Ciudad De Portoviejo	PS	591	*Monte Cristi*	PS	456
Daiichi Maru No. 25	PS	218	*Monteneme*	PS	908
Danilo C	PS	142	*North Queen*	PS	257
Doménica L	PS	274	*Panama Tuna*	PS	3,264
Don Alvaro	PS	180	*Panchito L.*	PS	786
Don Antonio	PS	197	*Patricia*	PS	962
Don Bartolo	PS	495	*Rafa A*	PS	357
Don Mario	PS	552	*Reina Del Mar*	PS	1,033
Don Ramón	PS	1,881	*Roberto A*	PS	420
Doña Roge	PS	592	*Rocio*	PS	1,366
Doña Tula	PS	603	*Rodolfo X*	PS	662
Drennec	PS	1,915	*Romeo*	PS	125
Edu	PS	168	*Rosa F*	PS	756
Eillen Marie	PS	350	*Rossana L*	PS	809
El Conde	PS	230	*Samsun Ranger*	PS	1,033

TABLE 2. (continued)
TABLA 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**
Ecuador (cont.)			**México (cont.)**		
San Andres	PS	1,862	*Buenaventura I*	PS	996
Saturno	PS	106	*Buenaventura II*	PS	996
Southern Queen	PS	137	*Camila*	PS	493
Tarqui	PS	459	*Cartadedeces*	PS	702
Ugavi	PS	1,875	*Chac Mool*	PS	1,159
Ugavi Dos	PS	1,864	*Clipperton*	PS	1,480
Via Simoun	PS	1,324	*El Dorado*	PS	1,711
Yelisava	PS	855	*Ensenada*	PS	381
Yolanda L	PS	1,168	*Franz*	PS	1,610
			Guaymas	PS	460
España—Spain			*Hanna*	PS	1,610
Albacora Uno	PS	2,835	*Jeannine*	PS	1,281
Aurora B.	PS	2,060	*Lupe Del Mar*	PS	1,298
Rosita C	PS	2,060	*Manolo*	PS	300
			Maranatha	LP	125
Guatemala			*Maria Antonieta*	PS	1,118
Antonia F	PS	1,475	*María Beatriz*	PS	829
Vicente F	PS	1,581	*Maria Fernanda*	PS	1,416
			Maria Gabriela	LP	112
Honduras			*Maria Guadalupe*	PS	808
Blue Tuna	PS	1,012	*Maria Isabel I*	PS	381
Eastern Pacific	PS	547	*María Luisa*	PS	1,260
Lady Jannette	PS	141	*Maria Rosana*	PS	1,160
			Maria Veronica	PS	1,416
México			*Mazatun*	PS	1,480
Aguila Descalza	PS	493	*Mazcu I*	PS	276
Arkos I Chiapas	PS	1,348	*Mazpesca 2*	PS	1,181
Arkos II Chiapas	PS	1,348	*Molly N*	LP	101
Atilano Castano	PS	1,297	*Monica*	PS	1,154
Atun I	PS	822	*Nair*	PS	1,398
Atun VI	PS	1,062	*Nair II*	PS	1,161
Atun VII	PS	751	*Nair III*	PS	234
Atun VIII	PS	806	*San Gabriel*	PS	294
Azteca 1	PS	1,147	*San José*	PS	220
Azteca 2	PS	1,304	*San Uriel*	PS	296
Azteca 3	PS	1,520	*Tamara*	PS	493
Azteca 4	PS	1,273	*Theresa Janene*	PS	1,275
Azteca 5	PS	1,273	*Tizoc*	PS	240
Azteca 6	PS	1,273	*Westerly*	LP	42
Azteca 7	PS	1,520			
Azteca 8	PS	1,358	**Nicaragua**		
Azteca 9	PS	806	*Andrea F*	PS	1,217
Azteca 10	PS	1,627	*Atlantis IV F*	PS	1,274
Azteca 11	PS	493	*Cabo Marzo*	PS	1,083
Azteca 12	PS	493	*Capt. Joe Jorge*	PS	1,198
Bonnie	PS	1,312	*Pendruc*	PS	1,251

TABLE 2. (continued)
TABLA 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**
Panamá			**USA—EE.UU.**		
Aracely F	PS	1,581	*Cape San Lucas*	PS	1,311
Baraka	PS	1,287	*Donna B*	PS	170
Cape Breton	PS	2,032			
Cape Ferrat	PS	2,032	**Venezuela**		
Contadora I	PS	1,750	*Aleta Azul*	PS	1,298
Delia	PS	995	*Amazonas*	PS	1,084
El Marquez	PS	486	*Athena F*	PS	1,958
Esmeralda C.	PS	1,358	*Calypso*	PS	1,361
Esthercho	PS	1,170	*Canaima*	PS	1,386
Jane IV	PS	1,633	*Caribe Tuna*	PS	1,260
Julie L	PS	2,056	*Carmela*	PS	1,265
La Parrula	PS	1,188	*Caroni II*	PS	1,410
Lautaro	PS	1,275	*Cayude*	PS	1,145
Lucile F	PS	1,582	*Conquista*	PS	1,145
Maria Del Mar A	PS	2,304	*Curimagua*	PS	1,361
Marinero F	PS	1,244	*Daniela F*	PS	3,158
Milena A.	PS	996	*Don Abel*	PS	1,226
Napoleon I	PS	1,668	*Don Francesco*	PS	1,265
Pacific Tuna	PS	796	*Falcon*	PS	1,060
San Antonio	PS	255	*Judibana*	PS	1,145
Sea King F	PS	1,407	*La Rosa Mística*	PS	1,154
Sea Royal F	PS	1,488	*Los Roques*	PS	1,260
Sirenza I	PS	490	*Orinoco II*	PS	1,422
Sofia Lynn	PS	586	*Taurus I*	PS	1,380
Templario I	PS	1,363	*Taurus Tuna*	PS	1,380
Tiuna	PS	1,202	*Ventuari*	PS	1,506
Tunapesca	PS	1,161			
			Vanuatu		
Perú			*Amalia*	PS	1,446
Alina	PS	542	*Chiara*	PS	803
			Mirelur	PS	1,360
El Salvador					
Montealegre	PS	1,860	**Unknown—Desconocida**		
Montelape	PS	1,082	*Caribbean Star No. 31*	PS	209
Montelucia	PS	2,554			
Monterocio	PS	1,919			

TABLE 3. Change in the IATTC fleet list recorded during the third quarter of 2008. PS = purse seine.
TABLA 3. Cambio en la flota observada por la CIAT registrados durante el tercero trimestre de 2008. PS = cerquero.

Vessel name	Flag	Gear	Capacity (m^3)	Remarks
Nombre del buque	**Bandera**	**Arte**	**Capacidad (m^3)**	**Comentarios**
Vessel added to the fleet—Buque añadido a la flota				
New entry—1er ingreso				
				Now—Ahora
El Conde	Ecuador	PS	230	

TABLE 4. Preliminary estimates of the retained catches of tunas in the EPO from 1 January through 28 September 2008, by species and vessel flag, in metric tons.
TABLA 4. Estimaciones preliminares de las capturas retenidas de atunes en el OPO del 1 de enero al 28 de septiembre de 2008, por especie y bandera del buque, en toneladas métricas**.**

Flag	Yellowfin	Skipjack	Bigeye	Pacific bluefin	Bonitos (*Sarda* spp.)	Albacore	Black skipjack	Other[1]	Total	Percentage of total
Bandera	**Aleta amarilla**	**Barrilete**	**Patudo**	**Aleta azul del Pacífico**	**Bonitos (*Sarda* spp.)**	**Albacora**	**Barrilete negro**	**Otras[1]**	**Total**	**Porcentaje del total**
Ecuador	18,719	110,309	28,861	-	23	-	11	217	158,140	35.1
México	65,561	20,938	867	4,396	5,690	9	2,796	61	100,318	22.3
Nicaragua	4,504	5,401	511	-	-	-	3	-	10,419	2.3
Panamá	23,372	34,521	5,750	-	66	-	27	93	63,829	14.2
Venezuela	18,256	23,725	1,704	-	9	-	55	24	43,773	9.7
Other—Otros[2]	23,712	39,702	10,309	-	5	-	9	4	73,741	16.4
Total	154,124	234,596	48,002	4,396	5,793	9	2,901	399	450,220	

[1] Includes other tunas, sharks, and miscellaneous fishes
[1] Incluye otros túnidos, tiburones, y peces diversos
[2] Includes Colombia, El Salvador, Guatemala, Honduras, Peru, Spain, and Vanuatu; this category is used to avoid revealing the operations of individual vessels or companies.
[2] Incluye Colombia, El Salvador, España, Guatemala, Honduras, Perú, y Vanuatu; se usa esta categoría para no revelar información sobre faenas de buques o empresas individuales.

TABLE 5. Logged catches and catches per day's fishing[1] (CPDF) of yellowfin in the EPO, in metric tons, during the period of 1 January-30 June, based on fishing vessel logbook information. Because the catches in this table include only data that meet the requirements for calculation of the CPDFs, they are less than the total catches for the first two quarters of 2003-2008.

TABLA 5. Captura registrada y captura por día de pesca[1] CPDP) de aleta amarilla en el OPO, en toneladas métricas, durante el período de 1 de enero-30 de junio, basado en información de los cuadernos de bitácora de buques pesqueros. Ya que las capturas en esta tabla incluyen solamente los datos que satisfacen los requisitos para el cálculo de la CPDP, son menos que las capturas totales de los primeros dos trimestres durante 2003-2008.

Area	Fishery statistic Estadística de pesca	Year—Año					
		2003	2004	2005	2006	2007	2008[2]
Purse seine—Red de cerco							
North of 5°N Al norte de 5°N	Catch—Captura CPDF—CPDP	131,600 22.1	71,000 11.8	72,000 12.7	52,200 9.4	51,100 9.6	32,300 11.2
South of 5°N Al sur de 5°N	Catch—Captura CPDF—CPDP	30,000 5.1	59,500 7.3	35,800 5.5	17,100 2.3	16,000 2.8	16,600 3.6
Total	Catch—Captura CPDF—CPDP	161,600 19.0	130,500 9.7	107,800 10.3	69,300 7.7	67,100 8.0	48,900 8.6
Annual total Total anual	Catch—Captura	275,200	193,200	162,000	106,400	103,800	
Pole and line—Cañero							
Total	Catch—Captura CPDF—CPDP	<100 0.3	<100 0.3	400 3.8		<100 1.0	
Annual total	Catch—Captura	500	1,800	800	500	800	

[1] Purse-seiners with carrying capacities greater than 363 metric tons only; all pole-and-line vessels. The catch values are rounded to the nearest 100, and the CPDF values to the nearest 0.1.

[1] Cerqueros con capacidad de acarreo más de 363 toneladas métricas únicamente; todos buques cañeros. Se redondean los valores de captura al 100 más cercano, y los de CPDP al 0.1 más cercano.

[2] Preliminary

[2] Preliminar

TABLE 6. Logged catches and catches per day's fishing[1] (CPDF) of skipjack in the EPO, in metric tons, during the period of 1 January-30 June, based on fishing vessel logbook information. Because the catches in this table include only data that meet the requirements for calculation of the CPDFs, they are less than the total catches for the first two quarters of 2003-2008.

TABLA 6. Captura registrada y captura por día de pesca[1] (CPDP) de barrilete en el OPO, en toneladas métricas, durante el período de 1 de enero-30 de junio, basado en información de los cuadernos de bitácora de buques pesqueros. Ya que las capturas en esta tabla incluyen solamente los datos que satisfacen los requisitos para el cálculo de la CPDP, son menos que las capturas totales de los primeros dos trimestres durante 2003-2008.

Area	Fishery statistic Estadística de pesca	Year—Año 2003	2004	2005	2006	2007	2008[2]
Purse seine—Red de cerco							
North of 5°N Al norte de 5°N	Catch—Captura CPDF—CPDP	17,000 2.9	14,300 2.4	20,800 3.7	14,600 2.6	11,300 2.1	6,600 2.3
South of 5°N Al sur de 5°N	Catch—Captura CPDF—CPDP	58,700 10.0	56,600 6.9	71,300 11.0	64,700 8.6	37,200 6.5	61,800 13.4
Total	Catch—Captura CPDF—CPDP	75,700 8.4	70,900 6.0	92,100 9.3	79,300 7.5	48,500 5.5	68,400 12.3
Annual total Total anual	Catch—Captura	155,000	132,500	148,600	146,700	84,600	
Pole and line—Cañero							
Total	Catch—Captura CPDF—CPDP	<100 1.0	400 2.9	100 0.7			
Annual total	Catch—Captura	500	500	400	300	200	

[1] Purse-seiners with carrying capacities greater than 363 metric tons only; all pole-and-line vessels. The catch values are rounded to the nearest 100, and the CPDF values to the nearest 0.1.

[1] Cerqueros con capacidad de acarreo más de 363 toneladas métricas únicamente; todos buques cañeros. Se redondean los valores de captura al 100 más cercano, y los de CPDP al 0.1 más cercano.

[2] Preliminary

[2] Preliminar

TABLE 7. Logged catches and catches per day's fishing[1] (CPDF) of bigeye in the EPO, in metric tons, during the period of 1 January-30 June, based on purse-seine vessel logbook information. Because the catches in this table include only data that meet the requirements for calculation of the CPDFs, they are less than the total catches for the first two quarters of 2003-2008.

TABLA 7. Captura registrada y captura por día de pesca[1] (CPDP) de patudo en el OPO, en toneladas métricas, durante el período de 1 de enero-30 de junio, basado en información de los cuadernos de bitácora de buques cerqueros. Ya que las capturas en esta tabla incluyen solamente los datos que satisfacen los requisitos para el cálculo de la CPDP, son menos que las capturas totales de los primeros dos trimestres durante 2003-2008.

Fishery statistic—Estadística de pesca	Year—Año					
	2003	2004	2005	2006	2007	2008[2]
Catch—Captura	11,900	18,300	11,900	17,900	11,700	13,400
CPDF—CPDP	1.7	1.8	1.5	2.0	1.8	2.8
Total annual catch—Captura total anual	33,100	43,100	28,500	34,100	23,000	

[1] Vessels with carrying capacities greater than 363 metric tons only. The catch values are rounded to the nearest 100, and the CPDF values to the nearest 0.1.

[1] Buques con capacidad de acarreo más de 363 toneladas métricas únicamente. Se redondean los valores de captura al 100 más cercano, y los de CPDF al 0.1 más cercano.

[2] Preliminary

[2] Preliminar

TABLE 8. Catches of bigeye tuna in the eastern Pacific Ocean during 2008 by longline vessels.

TABLA 8. Captures de atún patudo en el Océano Pacífico oriental durante 2008 por buques palangreros.

Country	First quarter	Second quarter	Third quarter				Total to date
			July	August	September	Total	
Pais	Primer trimestre	Segundo trimestre	Tercer trimestre				Total al fecha
			Julio	Agosto	Septiembre	Total	
China	271	120	66	404	24	494	885
Japan—Japón	3,729	2,352	1,148	1,258	838	3,242	9,325
Republic of Korea—República de Corea	-	-	-	-	-	-	-
Chinese Taipei—Taipei Chino	697	322	-	-	-	-	1,019
USA—EE.UU	-	-	-	-	-	-	-
Vanuatu	-	-	-	-	-	-	-
Total	4.697	2,794	1	1	8	3	1

TABLE 9. Preliminary data on the sampling coverage of trips by vessels with capacities greater than 363 metric tons by the observer programs of the IATTC, Colombia, Ecuador, the European Union, Mexico, Nicaragua, Panama, and Venezuela during the third quarter of 2008. The numbers in parentheses indicate cumulative totals for the year.

TABLA 9. Datos preliminares de la cobertura de muestreo de viajes de buques con capacidad más que 363 toneladas métricas por los programas de observadores de la CIAT, Colombia, Ecuador, México, Nicaragua, Panamá, el Unión Europea, y Venezuela durante el tercer trimestre de 2008. Los números en paréntesis indican totales acumulados para el año.

Flag	Trips		Observed by program						Percent observed	
			IATTC		National		Total			
Bandera	Viajes		Observado por programa						Porcentaje observado	
			CIAT		Nacional		Total			
Colombia	5	(37)	3	(18)	2	(19)	5	(37)	100.0	(100.0)
Ecuador	37	(228)	28	(152)	9	(76)	37	(228)	100.0	(100.0)
España—Spain	3	(14)	2	(7)	1	(7)	3	(14)	100.0	(100.0)
Guatemala	3	(8)	3	(8)			3	(8)	100.0	(100.0)
Honduras	3	(13)	3	(13)			3	(13)	100.0	(100.0)
México	61	(171)	37	(87)	24	(84)	61	(171)	100.0	(100.0)
Nicaragua	3	(14)	2	(7)	1	(7)	3	(14)	100.0	(100.0)
Panamá	21	(94)	8	(47)	13	(47)	21	(94)	100.0	(100.0)
Perú	1	(6)	1	(6)			1	(6)	100.0	(100.0)
El Salvador	5	(22)	5	(22)			5	(22)	100.0	(100.0)
U.S.A.-EE.UU.	0	(1)	0	(1)			0	(1)	-	(100.0)
Venezuela	15	(62)	10	(34)	5	(28)	15	(62)	100.0	(100.0)
Vanuatu	4	(15)	4	(15)			4	(15)	100.0	(100.0)
Total	161	(685)[1]	106	(417)	55	(268)	161	(685)[1]	100.0	(100.0)

[1] Includes 52 trips (36 by vessels with observers from the IATTC program and 16 by vessels with observers from the national programs) that began in late 2007 and ended in 2008

[1] Incluye 52 viajes (36 por observadores del programa del CIAT y 16 por observadores de los programas nacionales) iniciados a fines de 2007 y completados en 2008

TABLE 10. Oceanographic and meteorological data for the Pacific Ocean, October 2007-September 2008. The values in parentheses are anomalies. SST = sea-surface temperature; SOI = Southern Oscillation Index; SOI* and NOI* are defined in the text.
TABLA 10. Datos oceanográficos y meteorológicos del Océano Pacífico, octubre 2007-septiembre 2008. Los valores en paréntesis son anomalías. TSM = temperatura superficie del mar; IOS = Índice de Oscilación del Sur; IOS* y ION* están definidas en el texto.

Month—Mes	**10**	**11**	**12**	**1**	**2**	**3**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	18.8 (-2.1)	19.5 (-2.2)	20.8 (-2.0)	23.8 (-0.7)	26.3 (0.2)	27.3 (0.8)
Area 2 (5°N-5°S, 90°-150°W	23.4 (-1.5)	23.2 (-1.8)	23.6 (-1.5)	24.1 (-1.5)	25.0 (-1.4)	26.5 (-0.6)
Area 3 (5°N-5°S, 120°-170°W)	25.2 (-1.4)	25.1 (-1.5)	25.0 (-1.5)	24.7 (-1.8)	24.8 (-1.9)	26.0 (-1.1)
Area 4 (5°N-5°S, 150W°-160°E)	27.9 (-0.6)	27.4 (-0.9)	27.4 (-0.9)	26.6 (-1.5)	26.4 (-1.6)	26.8 (-1.3)
Thermocline depth—Profundidad de la termoclina, 0°, 80°W (m)	50	40	50	30	25	20
Thermocline depth—Profundidad de la termoclina, 0°, 110°W (m)	25	25	30	40	30	20
Thermocline depth—Profundidad de la termoclina, 0°, 150°W (m)	140	125	150	140	145	140
Thermocline depth—Profundidad de la termoclina, 0°, 180°W (m)	170	180	180	190	190	200
Sea level—Nivel del mar, Callao, Perú (cm)	-	-	96.3 (-12.3)	105.6 (-5.9)	103.7 (-10.2)	115.4 (0.7)
SOI—IOS	0.6	0.9	1.8	1.9	2.7	1.1
SOI*—IOS*	0.77	4.14	5.38	0.85	0.89	0.71
NOI*—ION*	2.13	3.97	7.03	1.34	5.69	8.12

Month—Mes	**4**	**5**	**6**	**7**	**8**	**9**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	25.9 (0.4)	24.4 (0.1)	23.7 (0.6)	22.7 (0.8)	21.9 (1.1)	21.2 (0.7)
Area 2 (5°N-5°S, 90°-150°W	27.2 (-0.2)	27.1 (0.0)	26.6 (0.2)	26.1 (0.6)	25.7 (0.7)	25.1 (0.3)
Area 3 (5°N-5°S, 120°-170°W)	26.8 (-0.9)	27.2 (-0.6)	27.2 (-0.3)	27.2 (0.1)	26.9 (0.2)	26.5 (-0.2)
Area 4 (5°N-5°S, 150W°-160°E)	27.4 (-1.0)	27.9 (-0.8)	28.1 (-0.6)	28.3 (-0.3)	28.2 (-0.3)	28.1 (-0.4)
Thermocline depth—Profundidad de la termoclina, 0°, 80°W (m)	15	80	70	35	45	30
Thermocline depth—Profundidad de la termoclina, 0°, 110°W (m)	40	80	70	50	60	45
Thermocline depth—Profundidad de la termoclina, 0°, 150°W (m)	140	140	145	170	125	125
Thermocline depth—Profundidad de la termoclina, 0°, 180°W (m)	200	200	180	170	170	170
Sea level—Nivel del mar, Callao, Perú (cm)	112.4 (-2.1)	115.7 (2.2)	113.6 (1.6)	119.3 (9.2)	106.0 (-1.6)	107.2 (1.2)
SOI—IOS	0.6	-0.3	0.3	0.2	0.8	1.5
SOI*—IOS*	0.21	-4.85	3.56	-3.87	-0.75	0.72
NOI*—ION*	4.41	0.57	1.47	-1.58	-1.44	-0.10