INTER-AMERICAN TROPICAL TUNA COMMMISSION
COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

QUARTERLY REPORT—INFORME TRIMESTRAL

July-September 2006—Julio-Septiembre 2006

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HEADQUARTERS AND MAIN LABORATORY—OFICINA Y LABORATORIO PRINCIPAL
8604 La Jolla Shores Drive
La Jolla, California 92037-1508, USA
www.iattc.org

The

QUARTERLY REPORT

July-September 2006

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, and the Republic of Korea in 2005. 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 2004 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 by seven signatories that are Parties to the 1949 Convention. It was ratified by Mexico on 14 January 2005, and by El Salvador on 10 March 2005.

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 56th 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 NOTICE

On 12 July 2006 the IATTC field office in Manta, Ecuador, was given official status by the Ministerio de Relaciones Exteriores of Ecuador as the office of an international organization that interacts with the government of that nation. (The Manta office was established unofficially in November 1958, and the first person in charge of that office was James Joseph, who eventually became Director of the IATTC.)

MEETINGS

Dr. Mark N. Maunder participated in a meeting of the Convention for the Conservation of Antarctic Marine Living Resources in Walvis Bay, Namibia, on 10-14 July 2006. His expenses were paid by that organization.

Dr. Martín A. Hall participated in a workshop, "Compartiendo Experiencias en la Conservación de Tortugas Marinas," which took place in Puerto Quetzal, Escuintla, Guatemala, on 20-22 July 2006.

Dr. Mark N. Maunder participated in the West Coast Groundfish Data/Modeling Workshop, sponsored by NOAA Fisheries and the Pacific Fishery Management Council, in Seattle, Washington, USA, on 8-10 August 2006. His expenses were paid by the Pelagic Fisheries Research Program of the University of Hawaii at Manoa.

There were two meetings of the Pacific-Atlantic Sea Turtle Assessment (PASTA) in August. The first meeting was held in La Jolla in early August, with Dr. Martín A. Hall and Mr. Simon D. Hoyle in attendance. The second was held at San Diego State University on 22-25 August 2006, with Drs. Hall and Mark N. Maunder in attendance.

On 21-22 August 2006, Drs. Mark N. Maunder and Robert J. Olson participated in a meeting of the participants in a 2-year project, "Intra-guild Predation and Cannibalism in Pelagic Predators: Implications for the Dynamics, Assessment, and Management of Pacific Tuna Populations," sponsored by the Pelagic Fisheries Research Program of the University of Hawaii at Manoa and led by Dr. Timothy E. Essington of the University of Washington. Drs. Maunder and Olson are co-principal investigators in the project.

Dr. Mark N. Maunder participated in a meeting of the Scientific and Statistical Committee of the Pacific Fishery Management Council in Foster City, California, on 11-12 September 2006, where he gave a presentation on yellowfin tuna stock assessment in the EPO. His expenses were paid by the Pacific Fisheries Management Council.

DATA COLLECTION

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

Personnel at these offices abstracted logbook information for 333 trips of commercial fishing vessels during the third quarter of 2006. Also, 568 length-frequency samples of fish caught during the second quarter of 2006 that had been sampled by field office personnel were processed.

Also during the third quarter members of the field office staffs placed IATTC observers on 114 fishing trips by vessels that participate in the AIDCP On-Board Observer Program. In addition, 115 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 2006 is about 228,000 cubic meters (m^3) (Table 1). The weekly average at-sea capacity for the fleet, for the weekly periods ending 9 July through 1 October, was about 136,400 m^3 (range: 93,300 to 174,900 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 2006 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-1 October 2006, and the corresponding periods of 2001-2005, in metric tons (t) were:

Species	2006	2001-2005			Weekly average, 2006
		Average	Minimum	Maximum	
Yellowfin	150,900	291,200	224,900	332,700	2,800
Skipjack	214,700	156,500	114,200	212,300	5,500
Bigeye	45,100	31,700	24,300	40,300	1,000

The catches of yellowfin were less than those of any year of the 2001-2005 period, whereas the catches of both skipjack and bigeye were greater than those of any year of that period.

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 t, 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 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 2006 and the corresponding periods of 2001-2005, in metric tons, were:

Species	Region	2006	2001-2005		
			Average	Minimum	Maximum
Yellowfin	N of 5° N	9.1	18.4	11.6	25.6
	S of 5° N	2.4	7.0	5.0	11.2
Skipjack	N of 5° N	2.8	2.4	1.0	3.6
	S of 5° N	8.8	8.1	6.2	10.7
Bigeye	EPO	1.8	2.0	1.5	2.9

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 2006 are shown in Table 8. Equivalent data are not available for the other species of tunas, or for billfishes.

Artisanal longline fishery

Mr. Nickolas W. Vogel spent the period of 17-19 August 2006 in San Jose, Costa Rica, where he conducted a workshop on the use of an MS Access experimental data base used to collect information in the coastal longline fisheries of the eastern Pacific Ocean. Nine participants from Costa Rica, El Salvador, Guatemala, Nicaragua, and Panama attended the workshop. The information is used to study the effects of the use of circle hooks on the catch and bycatch rates in the longline fisheries. The workshop focused on the use of the data entry and editing tools provided in the experimental Access data base, and on instruction on the basic elements of an Access data base and the use of queries to summarize data. World Wildlife Fund Central America paid for Mr. Vogel's travel expenses.

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 1-4 (covering the years 2002-2005, 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 2001-2006 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 2006, and the second shows data for the combined strata for the second quarter of each year of the 2001-2006 period. Samples from 315 wells were taken during the second quarter of 2006.

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 315 wells sampled that contained fish caught during the second quarter of 2006, 196 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 area, and on schools associated with dolphins in the Northern and Inshore areas. Small amounts of yellowfin were caught in the Southern unassociated and Southern dolphin fisheries. Small amounts of 40-60 cm yellowfin were taken in floating-object sets, primarily in the Northern area.

The estimated size compositions of the yellowfin caught by all fisheries combined during the second quarters of 2001-2006 are shown in Figure 2b. The average weight of the yellowfin caught during the second quarter of 2006 (6.2 kg) was considerably less than those of the previous five years (11.6-21.3 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 315 wells sampled that contained fish caught during the second quarter of 2006, 257 contained skipjack. The estimated size compositions of these fish are shown in Figure 3a. Large amounts of skipjack 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, and Southern regions.

The estimated size compositions of the skipjack caught by all fisheries combined during the second quarters of 2001-2006 are shown in Figure 3b. The majority of the skipjack caught during the second quarter ranged between 40 and 50 cm. The average weight for the second quarter of 2006 (1.8 kg) was considerably less than those of the previous five years (2.3-4.2 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 315 wells sampled that contained fish caught during the second quarter of 2006, 97 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. Negligible 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 2001-2006 are shown in Figure 4b. The average weight of bigeye during the second quarter of 2006 was a little less than those of the previous four years and considerably

less than that of 2001. This was due to the presence of greater amounts of fish in the 40 to 60 cm length range in 2006.

The estimated retained catch of bigeye less than 60 cm in length during the first two quarters of 2006 was 17,979 metric tons (t), or about 45 percent of the estimated total purse-seine catch of bigeye during the first two quarters of 2006. The corresponding amounts for the first two quarters of 2000-2005 ranged from 1,992 to 8,767 t, or 4 to 47 percent. These values differ slightly from those given in previous Quarterly Reports due to a switch from using the "Standard Sampling Model" to using the "Species Composition Sampling Model."

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, 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).

In 2006 the observer programs of Colombia, the European Union, Mexico, 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 next paragraph, the IATTC is to cover all trips by vessels registered in other nations that are required to carry observers.

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

Observers from the On-Board Observer Program departed on 114 fishing trips aboard purse seiners covered by that program during the third quarter of 2006. Preliminary coverage data for these vessels during the quarter are shown in Table 9.

Training

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

RESEARCH

Reduced purse-seine catches of yellowfin in the EPO

The catch of yellowfin tuna during the first half of 2006 was the lowest since the 1980s. The assessment presented at the 74th meeting of the IATTC in June 2006 indicated that the annual recruitment during 2002-2004 was close to the average for 1983-2004, and that the recruitment for 2005 was relatively strong. The estimates of recruitment for the most recent years are rather imprecise, however. On a quarterly basis, the recruitment was estimated to be relatively weak during the first and second quarters of 2005, but strong during the third quarter of that year.

The staff's advice was that, while the current fishing effort (taking account of the recent increase in the size of the purse-seine fleet) was greater than that that would produce the average maximum sustainable yield (AMSY), the stock was not overfished. It seemed then that the most likely explanation for the low catches of yellowfin during early 2006 was reduced catchability of the fish.

The analyses have recently been updated to include data for the first half of 2006. These updated estimates indicate weaker recruitment for the first quarter of 2003 through the second quarter of 2005 than had previously been estimated. However, the recruitment during the third and fourth quarters of 2005 appears to have been strong. The weaker recruitment during 2003, 2004, and the first half of 2005 appears to have caused a decline in the biomass of the stock, which is now below the level that would produce the AMSY.

In addition, the average size of yellowfin in the catch has been reduced as the fleet appears to be switching its effort from offshore areas, where larger fish predominate in the catches, to inshore areas, where smaller fish are more common. It also appears that some vessels that ordinarily direct their effort mostly toward yellowfin have been directing it more toward skipjack and bluefin. The change is illustrated in the table below, which shows the catches in the first semester of 2001-2006 by set type, and the average weights of yellowfin in those catches. The catch in the first semester of 2006 declined precipitously for sets on dolphin-associated fish offshore, moderately for sets on dolphin-associated fish inshore, only slightly for sets on unassociated fish, and not at all for sets on fish associated with floating objects.

Year	Floating objects		Unassociated		Dolphin, inshore		Dolphin, offshore	
	Catch (metric tons)	Average weight (kg)	Catch (metric tons)	Average weight (kg)	Catch (metric tons)	Average weight (kg)	Catch (metric tons)	Average weight (kg)
2001	47,332	9.3	58,037	12.4	45,252	17.8	71,392	30.4
2002	20,835	4.9	39,182	15.4	64,231	23.3	92,290	31.1
2003	15,184	5.2	52,357	8.5	65,619	13.2	86,193	29.3
2004	11,263	5.6	50,978	9.1	47,398	13.4	60,572	30.6
2005	11,880	4.2	50,925	5.9	45,772	14.6	63,574	20.3
2006	12,832	2.9	43,001	5.4	30,597	13.0	21,932	22.1

During the first two quarters of 2006, the average weights of the yellowfin from the two apparently strong 2005 cohorts (from the third and fourth quarters) ranged from 2 to 7 kg. The fish were taken in sets on floating objects and unassociated schools, and comprised more than half of the catch of yellowfin in that time. Normally, most of the catch of yellowfin is taken in sets associated with dolphins. The cohorts from the third and fourth quarters of 2005 will not become well represented in sets on schools associated with dolphins in inshore areas until the first quarter of 2007.

It is still too early to know whether the new 2005 cohorts are really strong, or whether they are being exploited at a high rate. This should become clear in the stock assessment performed in 2007. If those cohorts turn out to be only average, the outlook will be low catches and the risk that fishing effort will remain directed at young fish, leading to a long-term reduction in the abundance of larger yellowfin associated with dolphins.

Tuna tagging

Mr. Kurt M. Schaefer spent the period of 26 July-5 August 2006 aboard the long-range sport-fishing vessel *Shogun*, chartered by the Monterey Bay Aquarium, where he participated in the implantation of archival tags in tunas off northern Baja California, Mexico. The tagging component of the charter was part of the Tagging of Pacific Pelagics (TOPP) program, which is one of several programs supported by the Census of Marine Life (COML). Archival tags (Lotek LTD 2310) were implanted into 41 yellowfin and 34 albacore. In addition, 21 bluefin were captured and held alive aboard the vessel for transfer to the Tuna Research Center at Hopkins Marine Station, Stanford University, where they will be used primarily in physiology experiments.

Ecosystem studies

Two cruises conducted by the U. S. National Marine Fisheries Service (NMFS), Southwest Fisheries Science Center, are collecting samples for a study that Dr. Robert J. Olson and colleagues from other institutions are conducting. Two NOAA (National Oceanographic and Atmospheric Administration) research vessels, the *David Starr Jordan* and the *McArthur II*, left San Diego on 29 July 2006, for 4-month cruises under the *Stenella* Abundance Research Project (STAR 2006). STAR is a multi-year study designed to assess the status of the dolphin stocks that have been taken as incidental catch by the tuna purse-seine fishery in the EPO, and to study physical and biological aspects of the ecosystem. The samples were collected for Dr. Olson to increase the sampling coverage for a study of the trophic structure of the food-webs in the equatorial eastern, central, and western Pacific Ocean, using stable carbon and nitrogen isotopes and diet analysis. The study is funded by a grant from the Pelagic Fisheries Research Program of the University of Hawaii. Prior to sailing, Dr. Olson placed equipment on the research vessels to collect zooplankton samples by bongo net hauls, to collect forage organisms by dipnetting, to filter seawater for particulate organic matter (POM), and to sample stomachs, muscle tissue, and liver tissue from pelagic fishes caught opportunistically. NMFS oceanographic technicians aboard the research vessels are conducting much of the sampling. The POM samples will be shared with Ms. Iliana Ruiz-Cooley, a Ph.D. candidate at the University of New Mexico, who is using stable isotope analysis to study the spatial variation in the trophic ecology of pelagic squids in the EPO.

Early life history studies

On 1 August 2006 representatives of the Autoridad Marítima de Panamá (AMP), the Ministerio de Desarrollo Agropecuario (MIDA), and the Instituto de Investigaciones Científicas Avanzadas y Servicios de Alta Tecnología (INDICASAT) met at the Achotines Laboratory to review activities since the signing of the AMP-MIDA-CIAT-INDICASAT Memorandum of Understanding in January 2005, and to plan future joint research.

Yellowfin broodstock

The yellowfin broodstock in Tank 1 (1,362,000 L) at the Achotines Laboratory spawned intermittently during the quarter. Spawning took place on 1-4 and 13-20 July, 3-31 August, except for two days during that period, and 1-30 September, except for five days during that month. Spawning occurred between 09:25 p.m. and 00:30 a.m. The numbers of eggs collected after each spawning event ranged from about 1,000 to 815,000. The water temperatures in the tank ranged from 28.0° to 29.5°C during the quarter.

Two males (36 and 54 kg) and one 41-kg female died during the quarter. The female died from striking the tank wall, one male died of starvation, and the other male died of unknown causes. At the end of September there were 19 fish, ranging in weight from approximately 37 to 58 kg, 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, six fish from those groups remained in Tank 1.

At the end of September there were 10 small (5- to 8-kg) yellowfin tuna in Tank 2 (170,000 L). On September 27, prototype archival tags were implanted into eight of these fish for testing of the tags.

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 Dirección General de Recursos Marinos y Costeros (DGRMC) de Panamá.

Two separate broodstocks of snappers are being kept in two 85,000-L tanks. The first consists of 15 individuals from the original broodstock caught in 1996. They continued to spawn intermittently during the quarter.

The second group consists of 20 individuals from a group bred at the Laboratory from eggs obtained from spawning in 1998. These fish also spawned intermittently during the quarter.

A group of juvenile pargos is being kept in raceway tanks. The larvae were hatched in mid-July and reared to the juvenile stage. The juveniles will be transported to several off-site locations in Panama and stocked in either ponds or floating cages during the fourth quarter of 2006.

Inter-agency cooperation

The University of Miami and the IATTC held their fourth workshop on "Physiology and Aquaculture of Pelagics, with Emphasis on Reproduction and Early Developmental Stages of Yellowfin Tuna" on 19-26 July 2006. The organizers were Dr. Daniel Margulies and Mr. Vernon P. Scholey of the IATTC staff and Dr. Daniel Benetti, Director of the Aquaculture Program of the Rosenstiel School of Marine and Atmospheric Science, University of Miami, with the latter two serving as workshop instructors. The participants were Mr. Miles Wise of Clean Seas Tuna (a Stehr Group company) in Australia, Mr. Manuel McIlroy, a graduate student at Florida Atlantic University, and four graduate students at the University of Miami, Messrs. Donald Bacoat, Fernando Cavalin, Bristol Denlinger, and Don Gentile, all of whom took the course for credit. A fee for the participants covered the expenses of putting on the workshop. Mr. Amado Cano and several members of the IATTC staff at the Achotines Laboratory also participated in portions of the workshop. As part of the workshop, yellowfin and snapper larvae were cultured from the egg stage through the 10th day of feeding. (Some larval cultures had been initiated prior to the workshop.)

Visitors at the Achotines Laboratory

Dr. Kathryn Dickson and Ms. Juleen Dickson spent the period of 20 June-7 July 2006 at the Achotines Laboratory. Their activities there are described in the IATTC Quarterly Report for April-June 2006.

Dr. Steve Vollmer, a Marine Science Network post-doctoral fellow at the Smithsonian Tropical Research Institute, arrived at the Achotines Laboratory on 9 July 2006, and spent about a week sampling *Pocillopora* corals in Achotines Bay and at Isla Iguana. He returned to Achotines Laboratory in September, and did further sampling from 12-16 September at the same locations.

Mr. Santiago Cambefort arrived at the Achotines Laboratory on 25 August 2006 for a planned stay of about one month. Mr. Cambefort, a Panamanian citizen, studied at the Escuela Politecnica in Guayaquil, Ecuador, and is completing his thesis work by carrying out a copepod culture project at the Achotines Laboratory. He worked with Mr. Luis Tejada and other Achotines Laboratory staff members, who are continuing their efforts to culture copepods to use as food for larval tunas.

Shark studies

IATTC staff members, in collaboration with Drs. Timothy E. Essington and Ray Hilborn of the University of Washington, are studying the spatial patchiness of sharks and other key

bycatch species in the eastern Pacific Ocean (EPO). The results of this research will be used to design proposed areas for fishery closures that would minimize bycatches without significantly affecting the catches of target species.

Dr. Mihoko Minami of the Institute of Statistical Mathematics, Tokyo, Japan, spent the period of 28 July-15 August 2006 at the IATTC headquarters in La Jolla, where she worked with Dr. Cleridy E. Lennert-Cody on estimation of trends in shark bycatch per purse-seine set in the EPO.

Oceanography and meteorology

Surface winds blow almost constantly over northern South America, which causes upwelling of cool, nutrient-rich subsurface water along the equator east of 160ºW, in the coastal regions off South America, and in offshore areas off Mexico and Central America. El Niño events are characterized by weaker-than-normal easterly surface winds, which cause above-normal sea-surface temperatures (SSTs) and sea levels and deeper-than-normal thermoclines over much of the 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 2005 the SSTs were nearly normal, although there were small areas of cool water, mostly near the coast, and small areas of warm water, mostly offshore, during nearly every month. During all three months of the first quarter of 2006 there was a narrow band of cool water that extended along the equator from as far east as about 90°W (in March) to as far west as about 180° (in February). In addition, there were large areas of warm water, mostly south of 20°S, during all three months. The narrow band of cool water that had occurred along the equator during the first quarter was not present during the second quarter. The large area of warm water that was present south of 20°S during March (IATTC Quarterly Report for January-March 2006: Figure 8) persisted in April, extending as far eastward as 100°W, but its area decreased considerably in May and it was absent in June. There were small areas of cool water off Baja California and northern Central America in April and May, but only the one off Baja California persisted in June (IATTC Quarterly Report for April-June 2006: Figure 5). During July there was a fairly extensive area of cool water off Mexico. During August there was a small area of warm water off northern Mexico and some small areas of warm water along the equator. In September there were three larger areas of warm water along the equator from the coast of South America to west of 180° and a small area of warm water off Baja California (Figure 5). The data in Table 10 are mixed, but overall they are indicative of a weak El Niño event. Most

notably, the SST anomalies in Areas 1, 2, 3, and 4 were positive throughout the quarter. Also, the thermocline at 0°-110°W was unusually deep during September. No patterns are evident in the data for the SOIs, SOI*s, and NOI*s. According to the Climate Diagnostics Bulletin of the U.S. National Weather Service for September 2006, "El Niño conditions are likely to continue into early 2007."

GEAR PROGRAM

During the third quarter an IATTC staff member participated in a dolphin safety-gear inspection and safety-panel alignment procedure aboard a Mexican-flag purse seiner.

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 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 and the numbers of samples taken were as follows:

Month	Trips completed	Samples taken	Fish sampled		
			Yellowfin	Skipjack	Bigeye
July	13	13	1,409	600	50
August	7	7	1,486	250	50
September	2	2	553	100	50
Total	22	22	3,448	950	150

INTERNATIONAL DOLPHIN CONSERVATION PROGRAM

Mr. Nickolas W. Vogel spent the period of 21-26 August 2006 in Panama, R.P., where he worked with the staff of the new Panamanian national observer program, the Programa Nacional de Observadores de Panamá. The first purse seiner to carry an observer from the Panamanian program began fishing in late March 2006. Panama has adopted the same data base structures and data entry and editing routines used by the IATTC and the national observer programs of Colombia, Ecuador, the European Union, and Venezuela. This permits easy exchange of complete data sets between the IATTC and those observer programs, with assurances that the data are of comparable quality, since they are edited using the same standards and the same error-checking computer programs. The first goal of the trip was the installation of data bases and computer programs used to enter, edit, and store the observer data, plus instructions on the use of the programs. The second goal was instruction in the basic procedures for processing data from the time an observer returns from a trip to the point at which the processed data are entered

into the final data base. Mr. Vogel's travel expenses were paid by the Panamanian national observer program.

PUBLICATIONS

IATTC publications

Maunder, Mark N., and Michael G. Hinton. 2006. Estimating relative abundance from catch and effort data, using neural networks. Inter-Amer. Trop. Tuna Comm., Spec. Rep., 15: 19 pp.

Román-Verdesoto, Marlon, and Mauricio Orozco-Zöller. 2006. Bycatches of sharks in the tuna purse-seine fishery of the eastern Pacific Ocean reported by observers of the Inter-American Tropical Tuna Commission, 1993-2004. Inter-Amer. Trop. Tuna Comm., Data Rep., 11: 67 pp.

Outside journals

Maunder, Mark N., Shelton J. Harley, and John Hampton. 2006. Including parameter uncertainty in forward projections of computationally intensive statistical population dynamic models. ICES Jour. Mar. Sci., 63 (6): 969-979.

Maunder, Mark N., John R. Sibert, Alain Fonteneau, John Hampton, Pierre Kleiber, and Shelton J. Harley. 2006. Interpreting catch per unit effort data to assess the status of individual stocks and communities. ICES Jour. Mar. Sci., 63 (8): 1373-1385.

Schaefer, Kurt. 2006. Yellowfin and wahoo in the Revillas. Pacific Coast Sportfishing, 12 (8): 18-25, 117.

ADMINISTRATION

Mr. Simon D. Hoyle, who had worked at the La Jolla office of the IATTC since July 2003, resigned on 28 July 2006 to accept a position with the Oceanic Fisheries Programme of the Secretariat of the Pacific Community in Noumea, New Caledonia. Mr. Hoyle worked principally on assessments of yellowfin and bigeye in the eastern Pacific Ocean and on Pacific-wide assessments of North Pacific albacore and bluefin. He will be missed, but everyone wishes him well in his new position.

Mr**.** Joshue Gross, who had been employed as a fisheries management specialist at the IATTC headquarters in La Jolla since March 2001, left the Commission staff on 15 August 2006. Everyone wishes him well in his future endeavors.

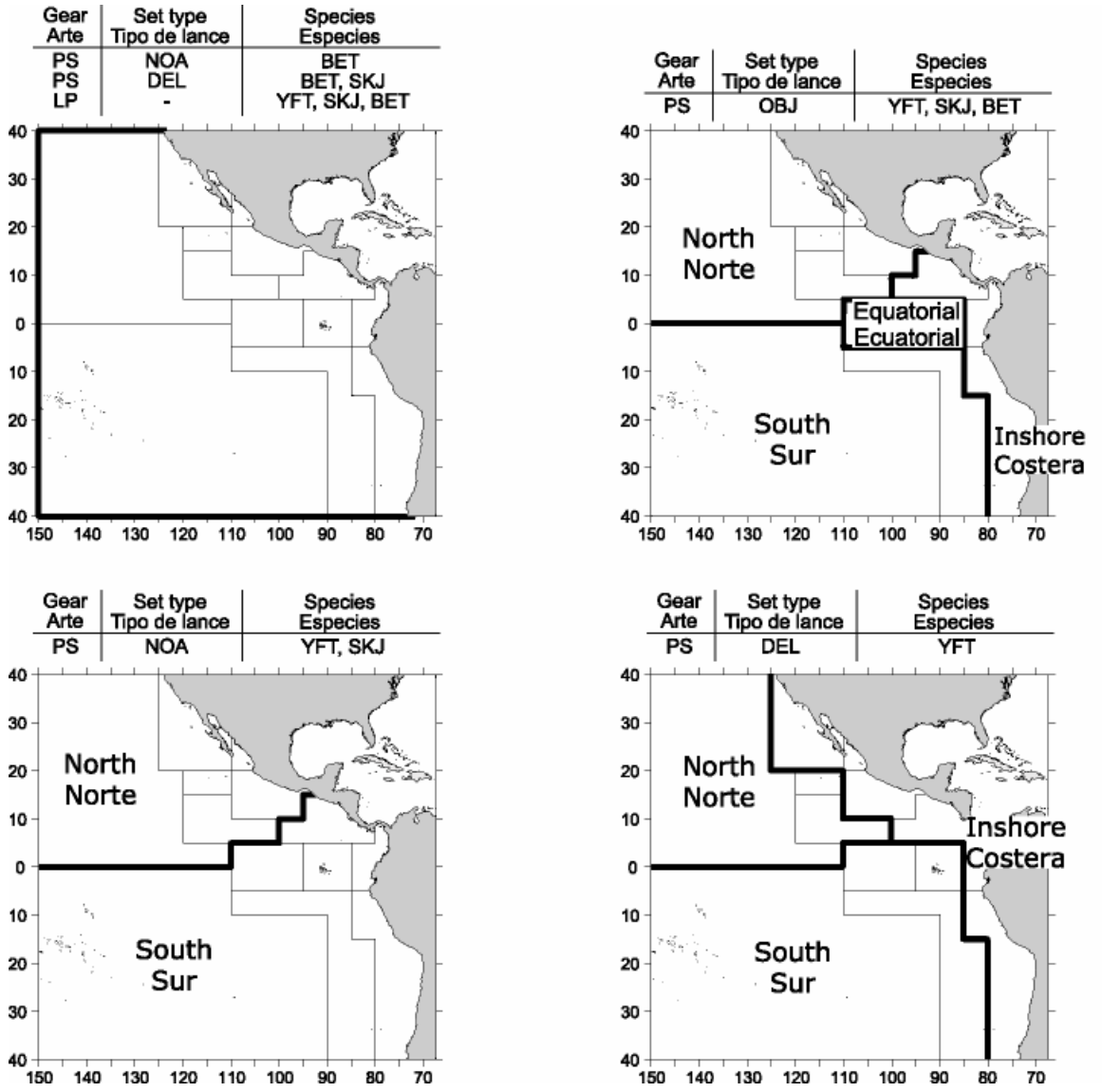

FIGURE 1. Spatial extents of the fisheries defined by the IATTC staff for stock assessment of yellowfin, skipjack, and bigeye in the EPO. The thin lines indicate the boundaries of the 13 length-frequency sampling areas, and the bold lines the boundaries of the fisheries. Gear: PS = purse seine, LP = pole and line; Set type: NOA = unassociated, DEL = dolphin, OBJ = floating object; Species: YFT = yellowfin, SKJ = skipjack, BET = bigeye.

FIGURA 1. Extensión espacial de las pesquerías definidas por el personal de la CIAT para la evaluación de las poblaciones de atún aleta amarilla, barrilete, patudo, y aleta azul 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. Artes: PS = red de cerco, LP = caña; Tipo de lance: NOA = no asociado, DEL = delfín; OBJ = objeto flotante; Especies: YFT = aleta amarilla, SKJ = barrilete, BET = patudo.

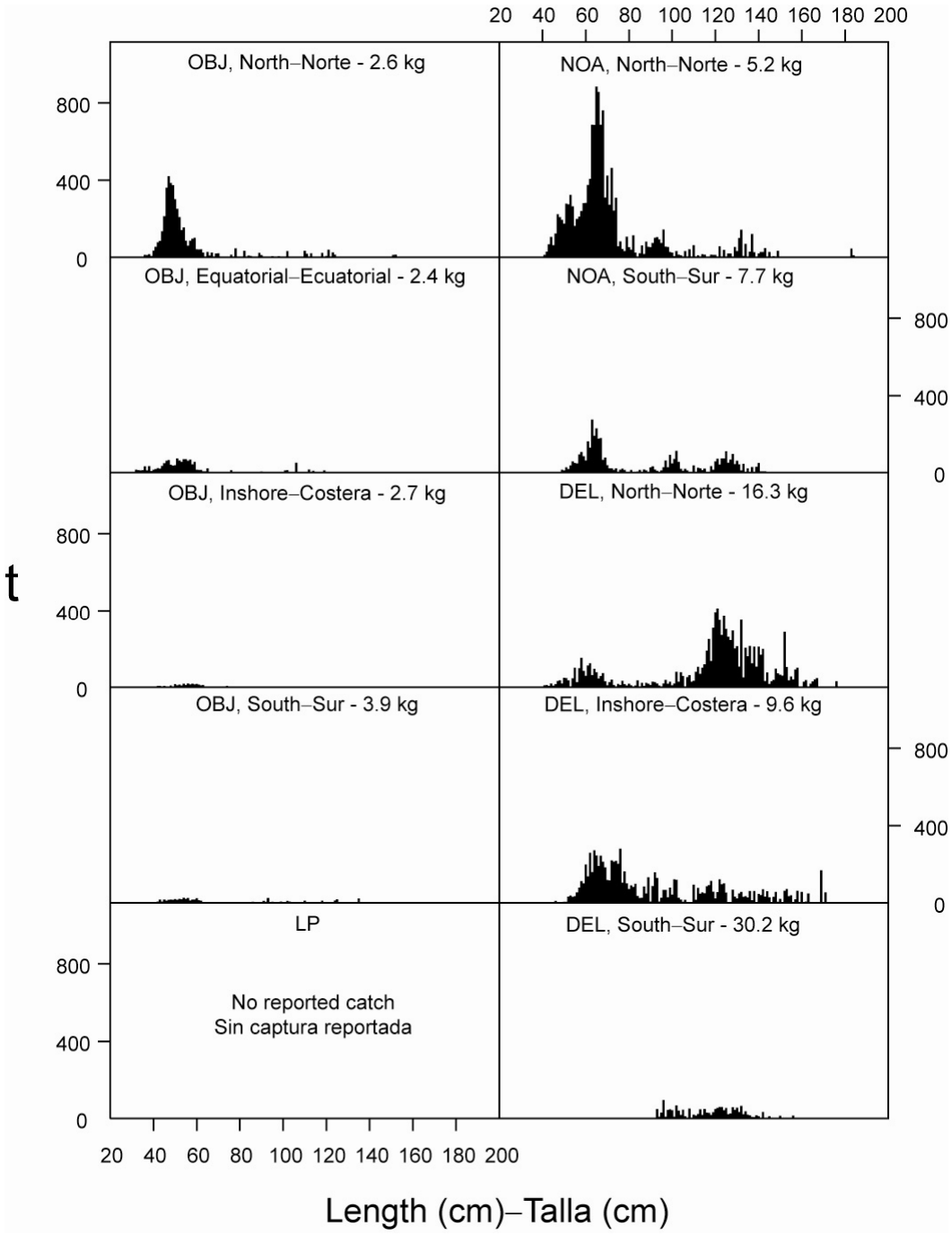

FIGURE 2a. Estimated size compositions of the yellowfin caught in each fishery of the EPO during the second quarter of 2006. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons; OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin.

FIGURA 2a. Composición por tallas estimada del aleta amarilla capturado en cada pesquería del OPO durante el segundo trimestre de 2006. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas; OBJ = objeto flotante; LP = caña; NOA = no asociado; DEL = delfín.

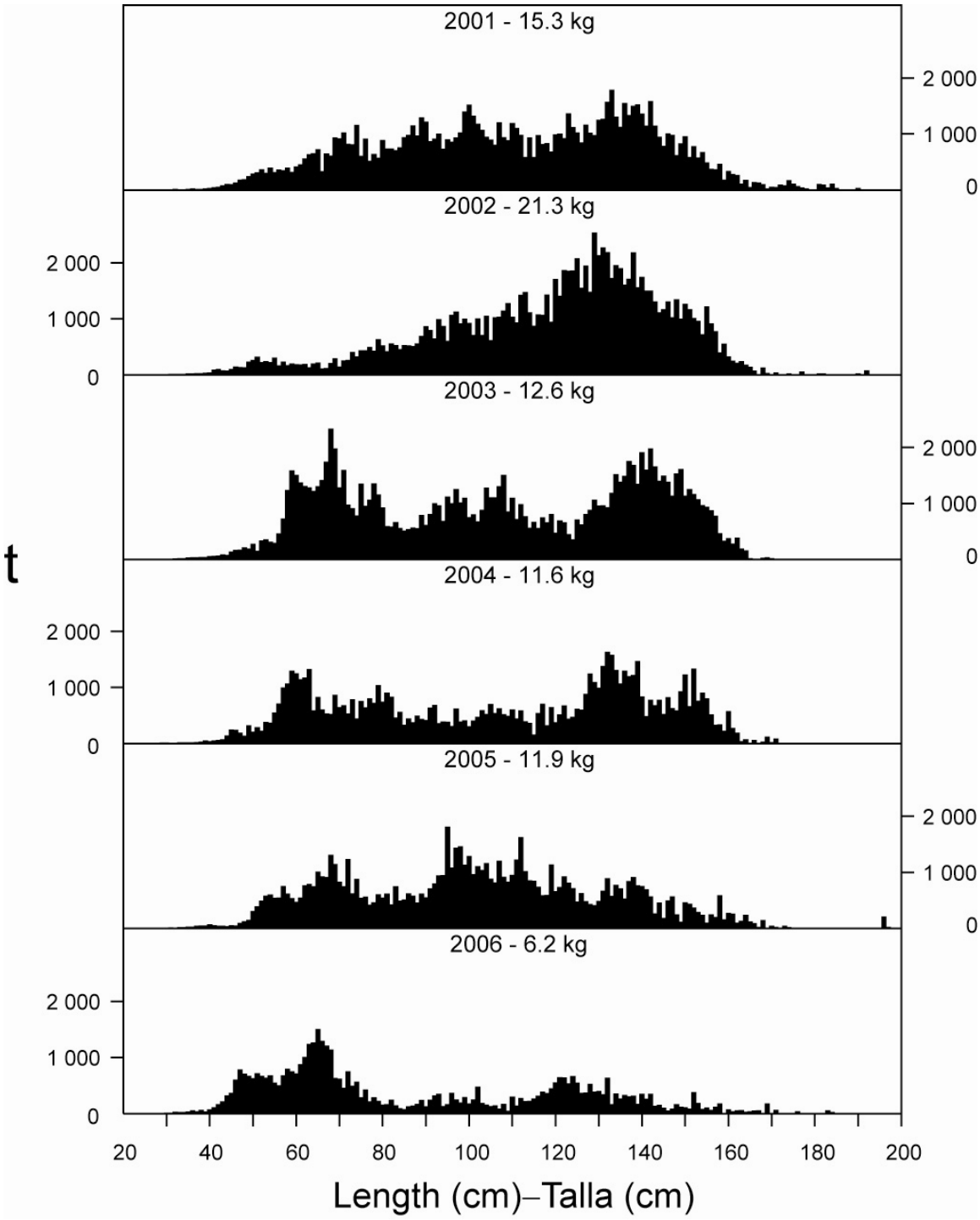

FIGURE 2b. Estimated size compositions of the yellowfin caught in the EPO during the second quarter of 2001-2006. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 2b. Composición por tallas estimada del aleta amarilla capturado en el OPO en el segundo trimestre durante 2001-2006. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas.

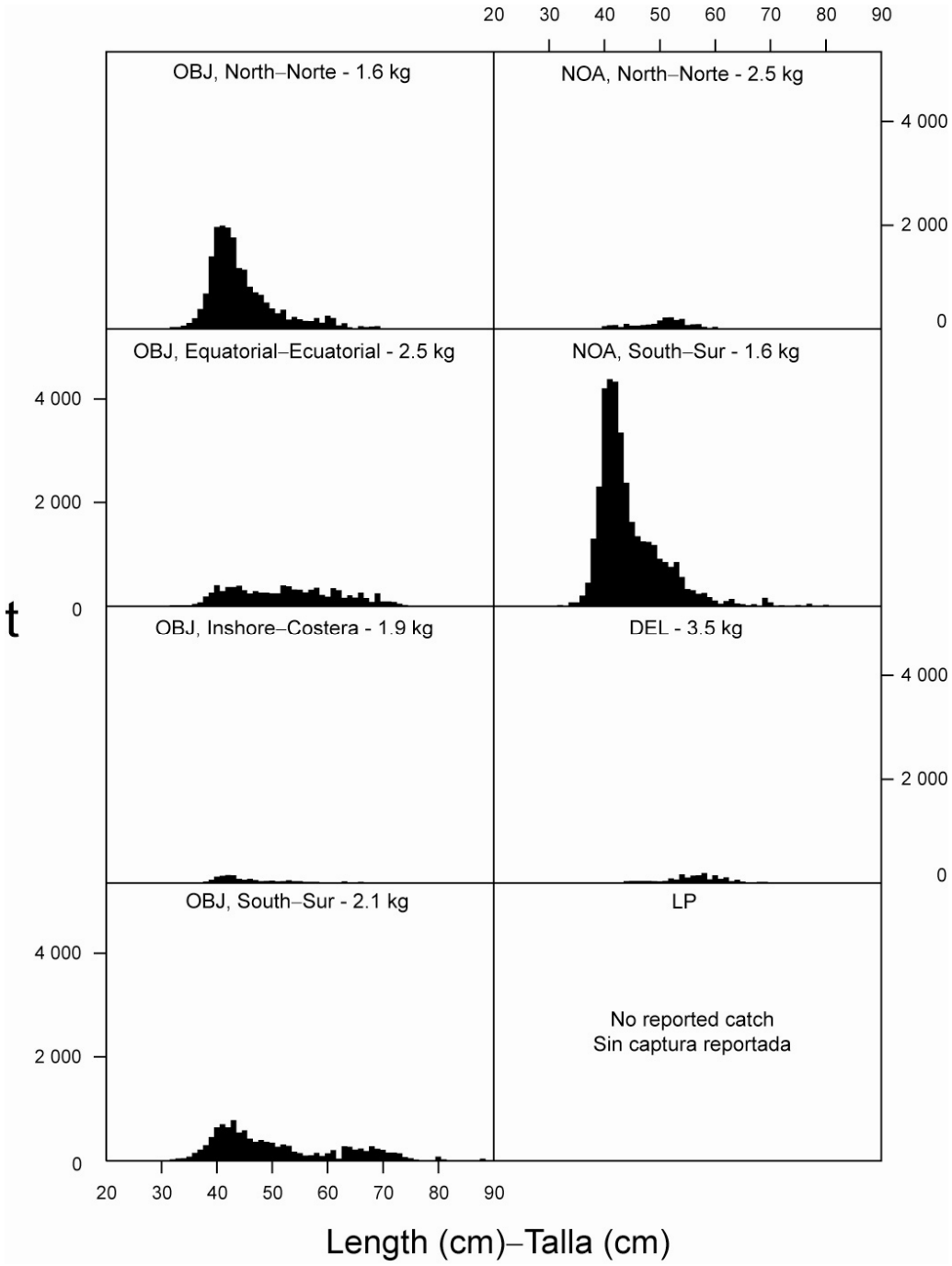

FIGURE 3a. Estimated size compositions of the skipjack caught in each fishery of the EPO during the second quarter of 2006. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons; OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin.

FIGURA 3a. Composición por tallas estimada del barrilete capturado en cada pesquería del OPO durante el segundo trimestre de 2006. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas; OBJ = objeto flotante; LP = caña; NOA = no asociado; DEL = delfín.

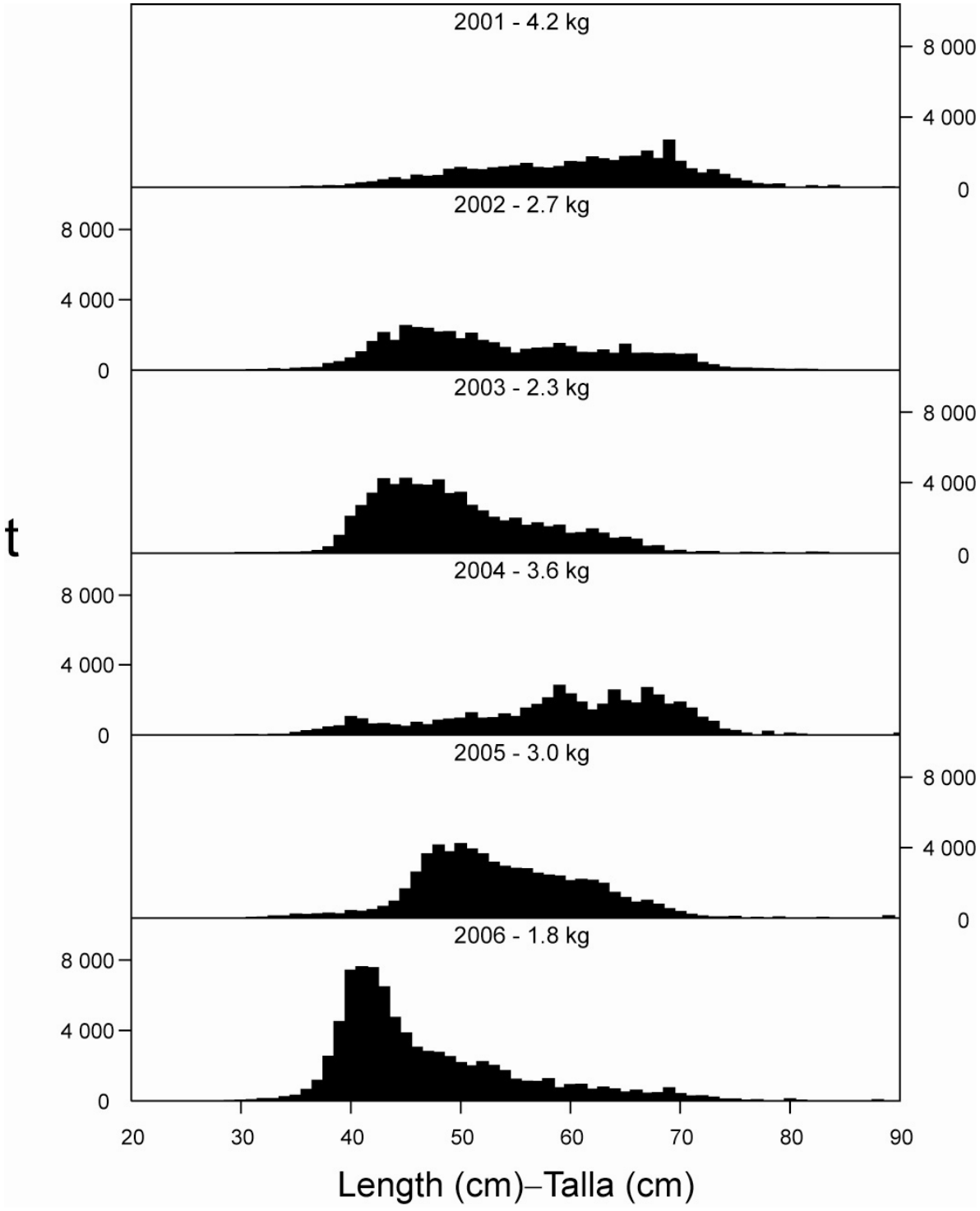

FIGURE 3b. Estimated size compositions of the skipjack caught in the EPO during the second quarter of 2001-2006. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.
FIGURA 3b. Composición por tallas estimada del barrilete capturado en el OPO en el segundo trimestre durante 2001-2006. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas.

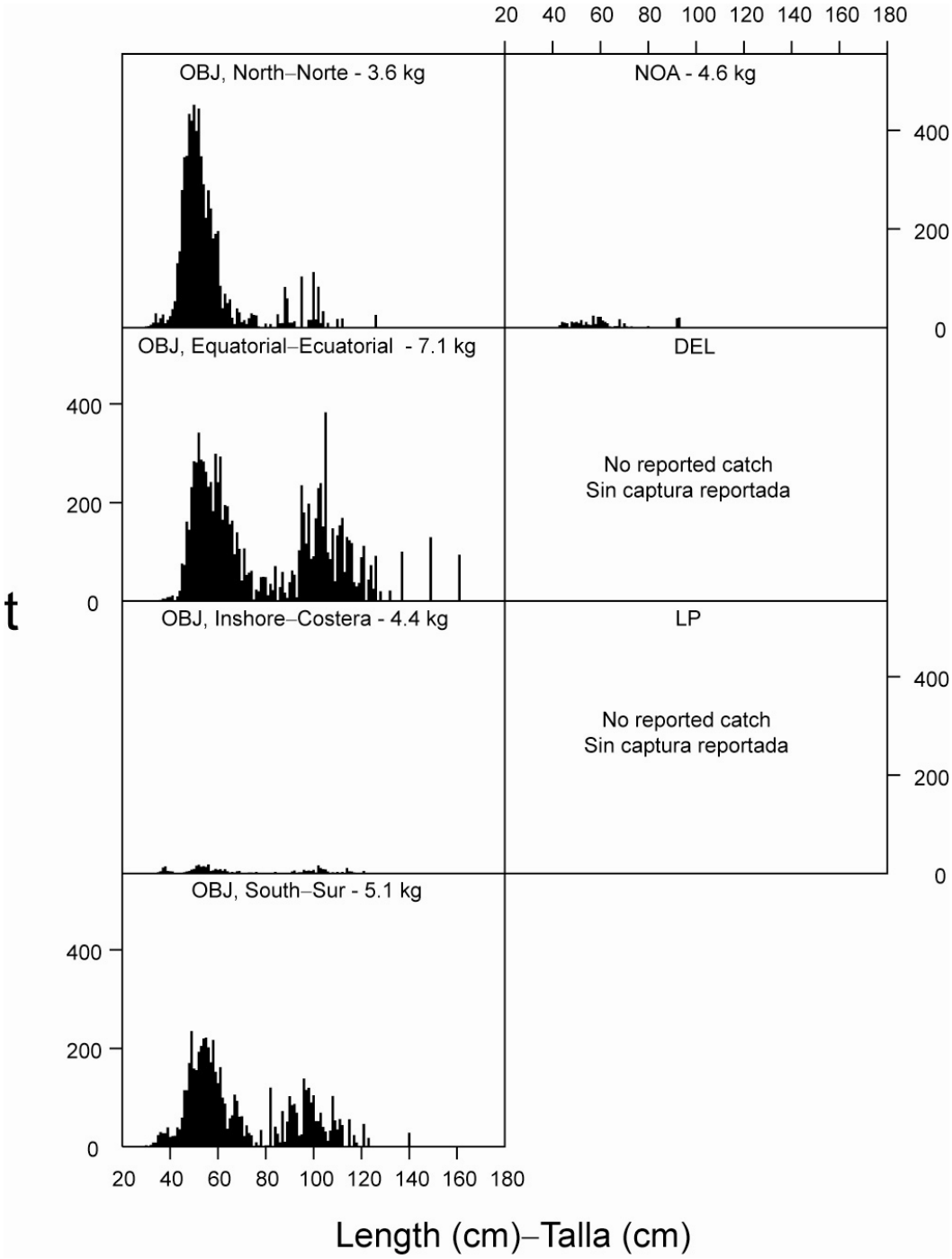

FIGURE 4a. Estimated size compositions of the bigeye caught in each fishery of the EPO during the second quarter of 2006. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons; OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin.

FIGURA 4a. Composición por tallas estimada del patudo capturado en cada pesquería del OPO durante el segundo trimestre de 2006. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas; OBJ = objeto flotante; LP = caña; NOA = no asociado; DEL = delfín.

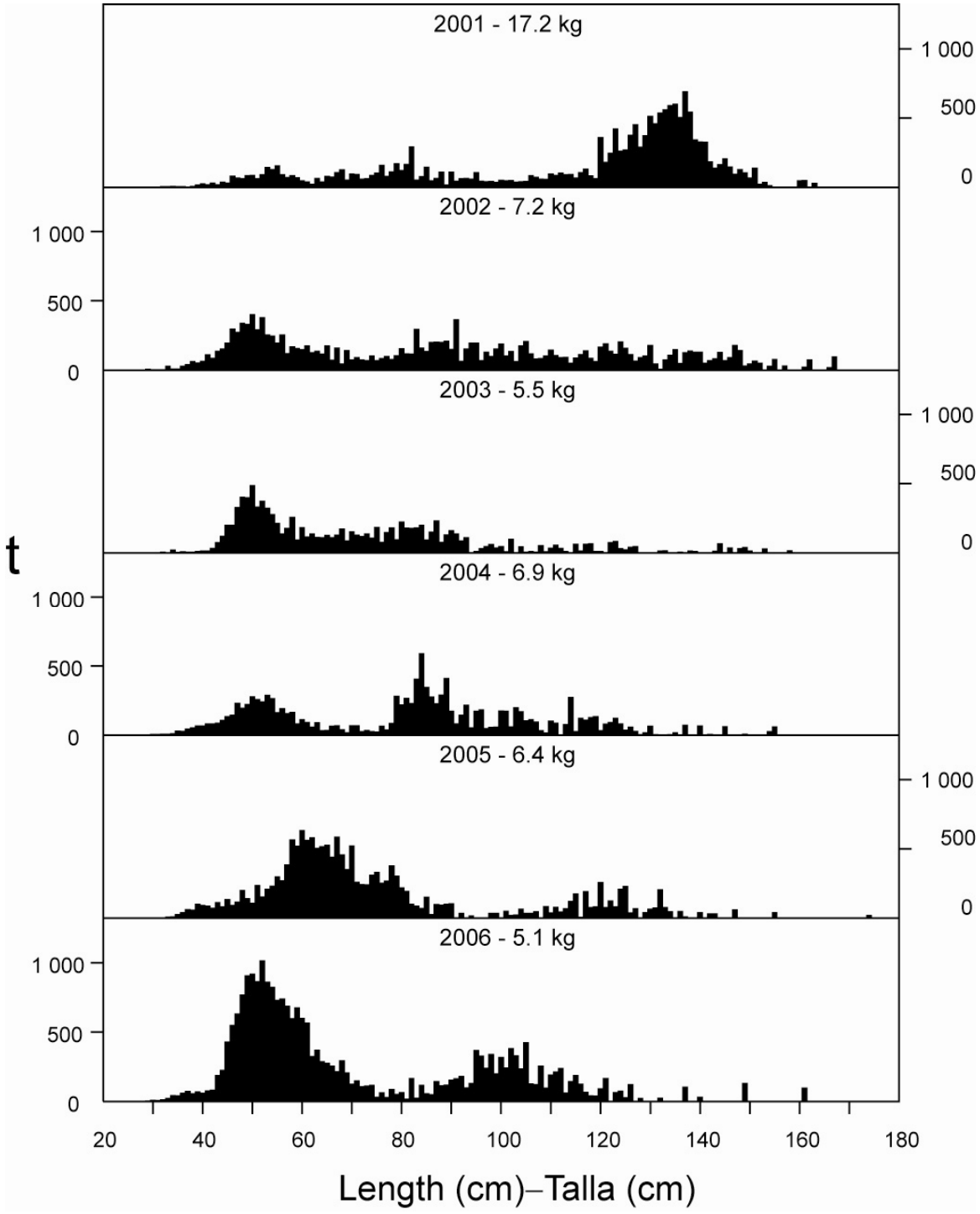

FIGURE 4b. Estimated size compositions of the bigeye caught in the EPO during the second quarter of 2001-2006. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.
FIGURA 4b. Composición por tallas estimada del patudo capturado en el OPO en el segundo trimestre durante 2001-2006. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas.

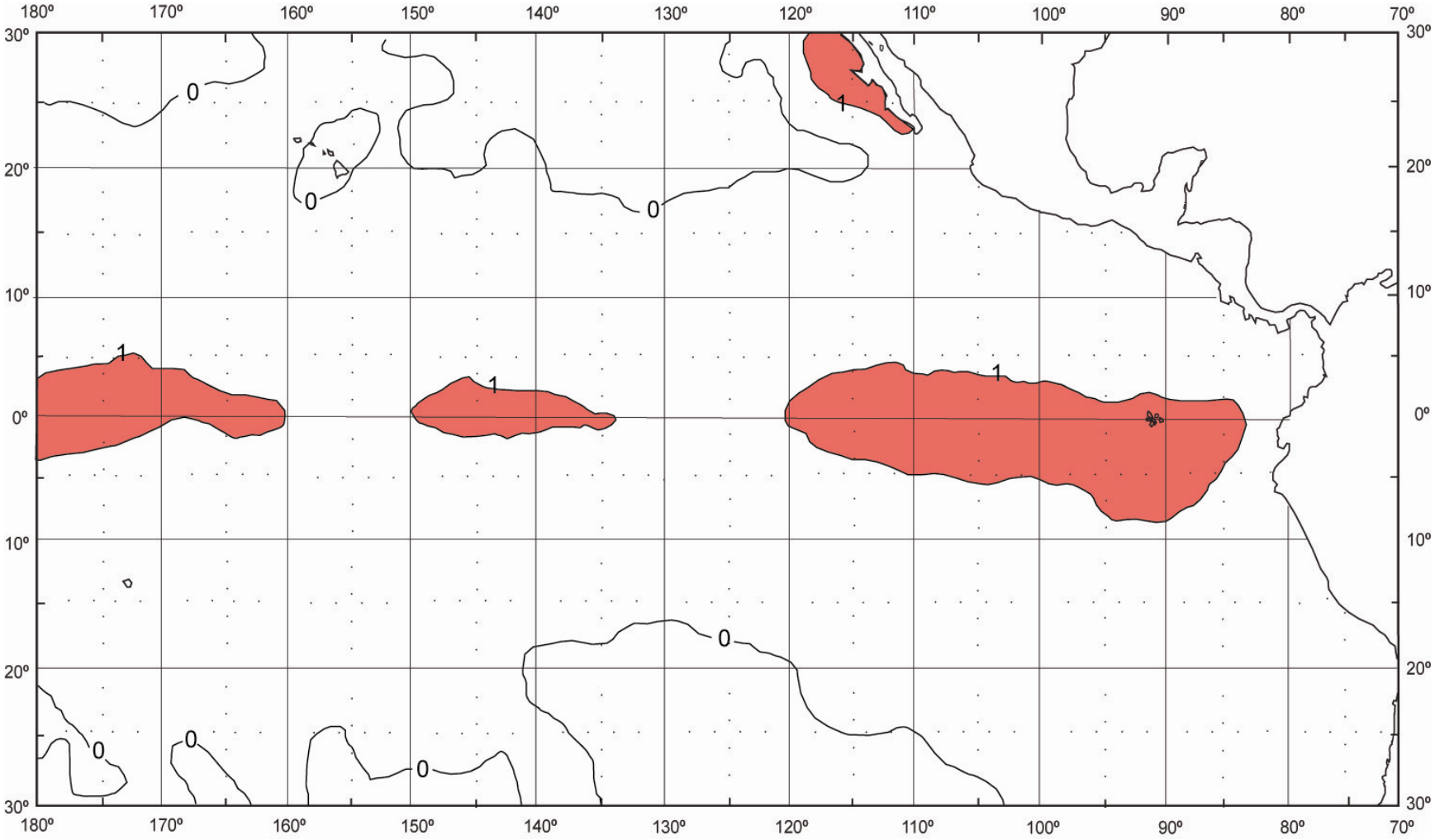

FIGURE 5. Sea-surface temperature (SST) anomalies (departures from long-term normals) for September 2006, based on data from fishing boats and other types of commercial vessels.
FIGURA 5. Anomalías (variaciones de los niveles normales a largo plazo) de la temperatura superficial del mar (TSM) en septiembre de 2006, 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 2006 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 2006, 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	3	10	-	13	14,439
Ecuador	PS	60	16	8	84	58,070
España—Spain	PS	-	-	3	3	6,955
Guatemala	PS	-	1	-	1	1,475
Honduras	PS	1	2	-	3	2,729
México	PS	28	32	1	61	57,780
	LP	4	-	-	4	498
Nicaragua	PS	1	6	-	7	8,308
Panamá	PS	5	14	6	25	34,339
El Salvador	PS	1	1	3	5	8,184
Unknown— Desconocida	PS	1	-	-	1	285
USA—EE.UU.	PS	1	1	-	2	1,763
Venezuela	PS	-	20	2	22	30,788
Vanuatu	PS	1	1	-	2	2,163
All flags— Todas banderas	PS	103	104	23	230	
	LP	4	-	-	4	
	PS + LP	107	104	23	234	
			Capacity—Capacidad			
All flags— Todas banderas	PS	46,103	132,651	48,746	227,500	
	LP	498	-	-	498	
	PS + LP	46,601	132,651	48,746	227,998	

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 October 1, 2006.
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 1 de octubre de 2006.

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	*Fernandito*	PS	147
			Fiorella L	PS	390
Colombia			*Gabriela A*	PS	420
Amanda S	PS	1,480	*Gloria A*	PS	699
American Eagle	PS	1,272	*Gloria C*	PS	248
Cabo De Hornos	PS	729	*Guayatuna Dos*	PS	1,881
El Dorado	PS	390	*Guayatuna Uno*	PS	1,881
El Rey	PS	1,152	*Ile Aux Moines*	PS	818
Enterprise	PS	1,274	*Ingalapagos*	PS	285
Gold Coast	PS	1,193	*Intrepido*	PS	85
Grenadier	PS	1,176	*Isabel Victoria V*	PS	389
Marta Lucia R.	PS	1,603	*Jacobita*	PS	374
Nazca	PS	1,451	*Joselito*	PS	91
Patricia Lynn	PS	270	*Julia D*	PS	1,419
Sandra C	PS	1,175	*Killa*	PS	399
Sea Gem	PS	1,274	*Lizi*	PS	1,038
			Ljbuica M.	PS	275
Ecuador			*Lucia T*	PS	738
Alejandra	PS	464	*Lucy*	PS	245
Alessia	PS	399	*Malula*	PS	849
Alize	PS	688	*Mandy*	PS	786
Amalis	PS	217	*Manuel Ignacio F*	PS	644
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	*Medjugorje*	PS	843
Carmen D	PS	490	*Milagros A*	PS	1,581
Cesar V	PS	335	*Miriam*	PS	176
Charo	PS	2,023	*Miry Ann D*	PS	497
Chasca	PS	399	*Monte Cristi*	PS	1,232
Ciudad De Portoviejo	PS	591	*Monteneme*	PS	908
Daiichi Maru No. 25	PS	218	*North Queen*	PS	257
Don Alvaro	PS	180	*Patricia*	PS	962
Don Antonio	PS	197	*Rafa A*	PS	357
Don Bartolo	PS	495	*Ramoncho*	PS	96
Don Luis	PS	180	*Roberto A*	PS	420
Don Mario	PS	552	*Rocio*	PS	1,366
Don Ramón	PS	1,881	*Rodolfo X*	PS	662
Doña Roge	PS	592	*Romeo*	PS	125
Doña Tula	PS	603	*Rosa F*	PS	756
Drennec	PS	1,915	*Rossana L*	PS	809
Edu	PS	168	*Samsun Ranger*	PS	1,033
Eillen Marie	PS	350	*San Andres*	PS	1,862
Elizabeth Cinco	PS	1,265	*San Mateo*	PS	1,033
Elizabeth F	PS	738	*Saturno*	PS	106
Emperador	PS	82	*Southern Queen*	PS	137

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**
Ecuador (cont.)			**México (cont.)**		
Tarqui	PS	459	*Chac Mool*	PS	1,190
Ugavi	PS	1,875	*Clipperton*	PS	1,480
Ugavi Dos	PS	1,864	*Delfin IX*	LP	160
Via Simoun	PS	1,324	*El Dorado*	PS	1,711
Western Pacific I	PS	274	*Ensenada*	PS	381
Yelisava	PS	855	*Estado 29*	PS	734
Yolanda L	PS	1,168	*Franz*	PS	1,610
			Guaymas	PS	460
España—Spain			*Jeannine*	PS	657
Albacora Uno	PS	2,835	*Juan Pablo I*	PS	300
Aurora B.	PS	2,060	*Juan Pablo II*	PS	250
Rosita C	PS	2,060	*Judith I*	PS	702
			Lupe Del Mar	PS	1,298
Guatemala			*Manolo*	PS	300
J M Martinac	PS	1,475	*Maranatha*	LP	125
			Maria Antonieta	PS	1,118
Honduras			*María Beatriz*	PS	829
Blue Tuna	PS	1,012	*Maria Del Mar*	PS	1,242
Eastern Pacific	PS	547	*Maria Fernanda*	PS	1,416
Esthercho	PS	1,170	*Maria Gabriela*	LP	112
			Maria Guadalupe	PS	808
México			*Maria Isabel*	PS	351
Aguila Descalza	PS	493	*María Luisa*	PS	1,260
Amalia Cristina	PS	1,311	*Maria Rosana*	PS	1,160
Ariete	PS	493	*Maria Veronica*	PS	1,416
Arkos I Chiapas	PS	1,348	*Mazatun*	PS	1,480
Arkos II Chiapas	PS	1,348	*Mazcu I*	PS	276
Atilano Castano	PS	1,297	*Mazpesca*	PS	493
Atun I	PS	807	*Molly N*	LP	101
Atun VI	PS	1,062	*Monica*	PS	1,154
Atun VIII	PS	806	*Nair*	PS	1,398
Azteca 1	PS	1,147	*Nair II*	PS	1,161
Azteca 10	PS	1,627	*Nair III*	PS	234
Azteca 11	PS	493	*San Gabriel*	PS	294
Azteca 12	PS	493	*San José*	PS	220
Azteca 2	PS	1,304	*San Rafael*	PS	294
Azteca 3	PS	1,520	*Tamara*	PS	493
Azteca 4	PS	1,273	*Theresa Janene*	PS	1,275
Azteca 5	PS	1,273	*Tutankamon*	PS	784
Azteca 6	PS	1,273			
Azteca 7	PS	1,520	**Nicaragua**		
Azteca 8	PS	1,358	*Andrea F*	PS	1,217
Azteca 9	PS	806	*Atlantis IV*	PS	660
Bonnie	PS	1,312	*Capt. Joe Jorge*	PS	1,198
Buenaventura I	PS	996	*Gabriela F*	PS	1,449
Buenaventura II	PS	996	*Pendruc*	PS	1,251
Camila	PS	493	*Raffaello*	PS	1,084
Cartadedeces	PS	702	*Victoria F*	PS	1,449

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**
Panamá			**USA—EE.UU.**		
Baraka	PS	1,287	*Cape Finisterre*	PS	1,593
Cape Breton	PS	2,032	*Donna B*	PS	170
Cape Ferrat	PS	2,032			
Contadora I	PS	1,750	**Venezuela**		
Delia	PS	995	*Amazonas*	PS	1,084
Don Camilo	PS	796	*Athena F*	PS	3,169
El Marquez	PS	486	*Calypso*	PS	1,361
Esmeralda C.	PS	1,358	*Canaima*	PS	1,386
Jane IV	PS	1,250	*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 I	PS	1,244	*Cuyuni*	PS	1,446
Milena A.	PS	996	*Daniela F*	PS	1,958
Napoleon I	PS	1,668	*Don Abel*	PS	1,226
Panama Tuna	PS	3,264	*Don Francesco*	PS	1,265
San Antonio	PS	255	*Falcon*	PS	1,060
Sea King	PS	1,487	*Judibana*	PS	1,145
Sea Royal	PS	1,488	*La Rosa Mística*	PS	1,154
Sirenza I	PS	490	*Los Roques*	PS	1,260
Sofia Lynn	PS	586	*Orinoco II*	PS	1,422
Templario I	PS	1,268	*Taurus I*	PS	1,380
Tiuna	PS	1,202	*Taurus Tuna*	PS	1,380
			Ventuari	PS	1,506
El Salvador					
Montealegre	PS	1,860	**Vanuatu**		
Montelape	PS	1,082	*Chiara*	PS	803
Montelucia	PS	2,554	*Mirelur*	PS	1,360
Monterocio	PS	1,919			
Tunapuy	PS	769	**Unknown—Desconocida**		
			Mary Lynn	PS	285

TABLE 3. Changes in the IATTC fleet list recorded during the third quarter of 2006. PS = purse seine; UNK = unknown.
TABLA 3. Cambios en la flota observada por la CIAT registrados durante el tercero trimestre de 2006. PS = cerquero; UNK = desconocida.

Vessel name	Flag	Gear	Capacity (m^3)	Remarks
Nombre del buque	**Bandera**	**Arte**	**Capacidad (m^3)**	**Comentarios**
Vessels added to the fleet—Buques añadidos a la flota				
New entries—1er ingresos				
				Now—Ahora
Daiichi Maru No. 25	Ecuador	PS	218	
Franz	México	PS	1,610	
Re-entries—Reingresos				
				Now—Ahora
Don Ramón	Ecuador	PS	1,881	
Rafa A	Ecuador	PS	357	
Jeannine	México	PS	657	
San Antonio	Panamá	PS	255	
Caribe Tuna	Venezuela	PS	1,260	
Changes of name or flag—Cambios de nombre o pabellon				
				Now—Ahora
Mary Lynn	Panamá	PS	285	UNK
Vessels removed from fleet—Buques retirados de la flota				
Dominador	Ecuador	PS	162	Sank – Se hundio

TABLE 4. Preliminary estimates of the retained catches of tunas in the EPO from 1 January through 1 October 2006, 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 1 de octubre de 2006, 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	22,411	99,199	21,179	-	-	-	85	160	143,034	33.6
Honduras	1,637	4,774	1,645	-	-	-	-	-	8,056	1.9
México	57,765	15,755	119	9,706	2,916	92	1,444	191	87,988	20.7
Nicaragua	6,048	2,554	981	-	-	-	-	1	9,584	2.3
Panamá	21,142	36,354	8,093	-	-	-	8	14	65,611	15.4
Venezuela	18,597	16,353	2,501	-	248	-	11	-	37,710	8.9
Other—Otros[2]	23,251	39,715	10,615	-	-	-	-	2	73,583	17.2
Total	150,851	214,704	45,133	9,706	3,164	92	1,548	368	425,566	

[1] Includes other tunas, sharks, and miscellaneous fishes
[1] Incluye otros túnidos, tiburones, y peces diversos
[2] Includes Bolivia, Colombia, El Salvador, Guatemala, Spain, United States, and Vanuatu; this category is used to avoid revealing the operations of individual vessels or companies.
[2] Incluye Bolivia, Colombia, El Salvador, España, Estados Unidos, Guatemala, y Vanuatú; 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.

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.

Area	Fishery statistic Estadística de pesca	Year—Año 2001	2002	2003	2004	2005	2006[2]
Purse seine—Red de cerco							
North of 5°N Al norte de 5°N	Catch—Captura CPDF—CPDP	84,800 20.6	102,900 25.6	131,600 21.7	71,000 11.6	71,600 12.5	42,200 9.1
South of 5°N Al sur de 5°N	Catch—Captura CPDF—CPDP	69,900 11.2	41,500 6.4	29,900 5.0	59,500 7.2	35,700 5.4	14,600 2.4
Total	Catch—Captura CPDF—CPDP	154,700 16.4	144,400 20.1	161,500 18.6	130,500 9.6	107,300 10.1	56,800 7.4
Annual total Total anual	Catch—Captura	255,600	261,800	275,100	192,800	160,600	
Pole and line—Cañero							
Total	Catch—Captura CPDF—CPDP	1,900 4.0	200 1.0	<100 0.3	<100 0.3	400 5.9	
Annual total	Catch—Captura	3,300	800	500	1,800	800	

[1] Purse-seiners with carrying capacities greater than 363 t 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 t 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.

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.

Area	Fishery statistic Estadística de pesca	Year—Año 2001	2002	2003	2004	2005	2006[2]
Purse seine—Red de cerco							
North of 5°N Al norte de 5°N	Catch—Captura CPDF—CPDP	8,600 2.1	4,100 1.0	17,000 2.8	14,300 2.3	20,600 3.6	12,700 2.8
South of 5°N Al sur de 5°N	Catch—Captura CPDF—CPDP	38,600 6.2	45,800 7.1	58,900 9.9	56,600 6.8	71,100 10.7	54,400 8.8
Total	Catch—Captura CPDF—CPDP	47,200 5.4	49,900 6.6	75,900 8.3	70,900 5.9	91,700 9.1	67,100 7.7
Annual total Total anual	Catch—Captura	85,600	84,300	155,200	131,900	147,700	
Pole and line—Cañero							
Total	Catch—Captura CPDF—CPDP	100 0.2	400 1.8	<100 1.0	400 2.9	100 0.0	
Annual total	Catch—Captura	300	500	500	500	400	

[1] Purse-seiners with carrying capacities greater than 363 t 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 t 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.

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.

Fishery statistic—Estadística de pesca	Year—Año					
	2001	2002	2003	2004	2005	2006[2]
Catch—Captura	18,900	13,500	11,900	18,300	11,900	13,700
CPDF—CPDP	2.9	2.0	1.7	1.8	1.5	1.8
Total annual catch—Captura total anual	36,600	26,700	33,100	43,100	28,300	

[1] Vessels with carrying capacities greater than 363 t 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 t 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 2006 by longline vessels.
TABLA 8. Captures de atún patudo en el Océano Pacífico oriental durante 2006 por buques palangreros.

	First quarter	Second quarter	July	August	September	Third quarter	Total to date
	Primer trimestre	Segundo trimestre	Julio	Agosto	Septiem-bre	Tercer trimestre	Total al fecha
China	-	-	-	-	-	-	-
European Union—Unión Europea	-	-	-	-	-	-	-
Japan—Japón	2,927	2,980	1,104	1,370	1,208	3,682	9,589
Republic of Korea—República de Corea	1,684	2,213	599	-	-	599	4,496
Chinese Taipei—Taipei Chino	881	1,650	427	440	-	867	3,388
Vanuatu	405	142	59	21	21	101	648
Total	5,897	6,975	2,189	1,831	1,229	5,249	18,121

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, Ecuador, the European Union, Mexico, Venezuela, and the Forum Fisheries Agency (FFA) during the third quarter of 2006. 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, Ecuador, México, el Unión Europea, Venezuela, y el Forum Fisheries Agency (FFA) durante el tercero trimestre de 2006. Los números en paréntesis indican totales acumulados para el año.

Flag	Trips		Observed by program						Percent observed	
			IATTC		National		FFA	Total		
Bandera	Viajes		Observado por programa						Porcentaje observado	
			CIAT		Nacional		FFA	Total		
Colombia	9	(41)	7	(22)	2	(19)		9 (41)	100.0	(100.0)
Ecuador	47	(226)	30	(148)	17	(78)		47 (226)	100.0	(100.0)
España—Spain	6	(20)	2	(11)	4	(9)		6 (20)	100.0	(100.0)
Guatemala	1	(4)	1	(4)				1 (4)	100.0	(100.0)
Honduras	2	(15)	2	(15)				2 (15)	100.0	(100.0)
México	61	(171)	32	(88)	29	(83)		61 (171)	100.0	(100.0)
Nicaragua	6	(21)	6	(21)				6 (21)	100.0	(100.0)
Panamá	27	(104)	16	(74)	11	(30)		27 (104)	100.0	(100.0)
El Salvador	5	(19)	5	(19)				5 (19)	100.0	(100.0)
U.S.A.—EE.UU.	1	(3)	1	(3)				1 (3)	100.0	(100.0)
Venezuela	19	(67)	8	(34)	11	(33)		19 (67)	100.0	(100.0)
Vanuatu	4	(10)	4	(10)				4 (10)	100.0	(100.0)
Total	188	(701)[1]	114	(449)	74	(252)		188 (701)	100.0	(100.0)

[1] Includes 90 trips (57 by vessels with observers from the IATTC program and 33 by vessels with observers from the national programs) that began in late 2005 and ended in 2006

[1] Incluye 90 viajes (57 por observadores del programa del CIAT y 33 por observadores de los programas nacionales) iniciados a fines de 2005 y completados en 2006

TABLE 10. Oceanographic and meteorological data for the Pacific Ocean, April-September 2006. The values in parentheses are anomalies. SST = sea-surface temperature; SOI = Southern Oscillation Index; NOI* = Northern Oscillation Index.
TABLA 10. Datos oceanográficos y meteorológicos del Océano Pacífico, abril-septiembre 2006. Los valores en paréntesis son anomalías. TSM = temperatura superficie del mar; IOS = Índice de Oscilación del Sur; ION* = Índice de Oscilación del Norte.

Month—Mes	**4**	**5**	**6**	**7**	**8**	**9**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	24.2 (-1.2)	24.0 (-0.4)	22.8 (-0.2)	22.2 (0.4)	21.6 (0.8)	21.4 (0.9)
Area 2 (5°N-5°S, 90°-150°W	27.3 (-0.1)	27.1 (0.0)	26.5 (0.1)	25.8 (0.3)	25.4 (0.5)	25.8 (0.9)
Area 3 (5°N-5°S, 120°-170°W)	27.8 (-0.1)	27.9 (0.1)	27.9 (0.4)	27.4 (0.3)	27.2 (0.5)	27.4 (0.7)
Area 4 (5°N-5°S, 150W°-160°E)	28.4 (-0.1)	28.9 (0.2)	29.2 (0.5)	29.1 (0.5)	29.2 (0.8)	29.4 (0.9)
Thermocline depth—Profundidad de la termoclina, 0°, 80°W (m)	15	40	40	40	40	40
Thermocline depth—Profundidad de la termoclina, 0°, 110°W (m)	40	45	45	50	50	95
Thermocline depth—Profundidad de la termoclina, 0°, 150°W (m)	140	130	140	140	140	150
Thermocline depth—Profundidad de la termoclina, 0°, 180°W (m)	170	175	180	175	170	160
Sea level—Nivel del mar, Baltra, Ecuador (cm)	192.1 (9.4)	196.5 (15.1)	197.3 (16.4)	193.2 (12.7)	187.6 (9.9)	195.6 (18.3)
Sea level—Nivel del mar, Callao, Perú (cm)	107.7 (-6.8)	112.0 (-1.5)	109.0 (-3.0)	-	-	-
SOI—IOS	0.9	-0.8	-0.7	-0.8	-1.6	-0.7
SOI*—IOS*	3.05	-3.13	-2.78	-3.67	-3.29	-2.65
NOI*—ION*	-0.89	-0.66	-0.15	-0.91	-0.47	0.58