INTER-AMERICAN TROPICAL TUNA COMMMISSION
COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

QUARTERLY REPORT—INFORME TRIMESTRAL

April-June 2007—Abril-Junio 2007

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The

QUARTERLY REPORT

April-June 2007

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 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 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, and Belize on 12 June 2007.

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 57th 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

We are pleased to report that Belize deposited its instrument of accession to the 2003 "Antigua Convention" on 12 June 2007. The convention has now been ratified or acceded to by Belize, El Salvador, the European Union, Mexico, Nicaragua, and the Republic of Korea.

Also, the fishing entity of Chinese Taipei has expressed its commitment, in writing, to abide by the terms of the Antigua Convention.

MEETINGS

IATTC meetings

The eighth meeting of the IATTC Working Group on Stock Assessment was held in La Jolla on 7-11 May 2007. Dr. Robin Allen presided at the meeting, Dr. Robert J. Olson served as one of the two rapporteurs, and presentations were made by Drs. Richard B. Deriso, Martín A.

Hall, Michael G. Hinton, Cleridy E. Lennert-Cody, Mark N. Maunder, Robert J. Olson, and Michael D. Scott, and Messrs. Alexandre Aires-da-Silva, Edward H. Everett, and Alejandro Pérez Rodríguez.

The following meetings of the IATTC and the IDCP and their working groups were held in Cancún, Mexico, in June 2007:

Inter-American Tropical Tuna Commission		
Meeting		**Dates**
8	Permanent Working Group on Compliance	21 June 2007
1	WCPFC-IATTC Consultative Meeting	24 June 2007
9	Working Group on Finance	26 June 2007
75	Inter-American Tropical Tuna Commission	25-29 June 2007

International Dolphin Conservation Program		
Meeting		**Dates**
23	Permanent Working Group on Tuna Tracking	18 June 2007
9	Working Group to Promote and Publicize the AIDCP Dolphin Safe Tuna Certification System	18 June 2007
43	International Review Panel	19 June 2007
15	Parties to the AIDCP	20 and 22 June 2007
5	Scientific Advisory Board	21 June 2007

IATTC and IDCP		
Meeting		**Date**
7	Joint Working Group on Fishing by Non-Parties	22 June 2007

Dr. Guillermo A. Compeán Jiménez, a graduate of the Université d'Aix-Marseille II, Marseilles, France, and currently Director General of the Fideicomiso de Investigación para Apoyar al Programa Nacional de Aprovechamiento del Atún y de Protección de Delfines y Otros en Torno a Especies Acuáticas Protegidas (FIDEMAR), Ensenada, Mexico, was selected as the new Director of the IATTC at the 75th meeting of the IATTC. He will assume his responsibilities in September 2007. Additional information on the outcome of the meetings will be reported in the IATTC web site shortly.

Other meetings

Dr. Robin Allen gave the keynote address at the CLIOTOP (Climate Impacts on Oceanic Top Predators) working group meeting, "The Challenge of Change: Managing for Sustainability of Oceanic Top Predator Species," which took place in Santa Barbara, California, on 12-13 April 2007.

Mr. Alexandre Aires-da-Silva participated in the Stock Assessment Input Data Review Meeting of the Bluefin Working Group of the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean in Shimizu, Japan, on 16-23 April 2007. A second meeting, the Stock Assessment Review Meeting, will take place in Pusan, Republic of Korea, on 19-21 July 2007.

Dr. Robin Allen participated in the annual meeting of the International Fisheries Commissions Pension Society in Ottawa, Canada, on 18-20 April 2007.

Dr. Robin Allen participated in the fifth Consultation on Conservation and Management of Southeastern Pacific Swordfish in Santiago, Chile, on 24-26 April 2007.

Dr. Martín A. Hall participated in the second meeting of the Bycatch Working Group of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean in Honolulu, Hawaii, on 2-5 May 2007.

Dr. Martín A. Hall and Mr. Ernesto Altamirano Nieto participated in the fifth International Fisheries Observer Conference held in Victoria, British Columbia, Canada, on 15-18 May 2007. Dr. Hall was the keynote speaker at the conference, and Mr. Altamirano participated in a Panel entitled "What Can Be Shared between Fishery Monitoring Programs throughout the World?" at the plenary session.

Many members of the IATTC staff attended all or parts of the 58th Tuna Conference in Lake Arrowhead, California, on 21-24 May 2007. Dr. Daniel Margulies and Ms. Jeanne B. Wexler served as co-chairs and Ms. Maria C. Santiago as coordinator of the conference. Mr. Kurt M. Schaefer was moderator of a session on "Movements and Behavior of Large Pelagics," Dr. William H. Bayliff was moderator of a session on "Foraging Ecology," and Ms. Jenny M. Suter was moderator of a session on "Biological Studies." Talks were given by Dr. Mark N. Maunder, Messrs. Daniel W. Fuller, Kurt M. Schaefer, and Vernon P. Scholey, and Ms. Jenny M. Suter. In addition, research in which Drs. Margulies, Maunder, and Robert J. Olson, Messrs. Fuller and Schaefer, and Mss. Santiago and Wexler had participated was presented by other speakers.

Dr. Martín A. Hall participated in a Marine Stewardship Council meeting in London, England, on 24-26 May 2007.

Dr. Mark N. Maunder spent the period of 3-12 June 2007, at the Centre for Ecological and Evolutionary Synthesis at the University of Oslo, Norway, where he worked with Drs. Tori Schweder of the University of Oslo and Tom Polacheck of the Marine and Atmospheric Research Division of the Commonwealth Scientific and Industrial Research Organisation of Australia on "Potential Inherent Estimation Biases in Fisheries Assessments." In addition, on 7-8 June 2007, he participated in a two-day workshop on "Size-structured Modeling of Marine Fish Populations," at which he gave a presentation entitled "Using Length-frequency Data in Fishery Assessment Models." His travel expenses were paid for by the Centre for Ecological and Evolutionary Synthesis.

Dr. Martín A. Hall participated in the "Waved Albatross Workshop," convened by the Agreement on the Conservation of Albatrosses and Petrels, in Lima, Peru, on 5-6 June 2007, a "Conservación Internacional Workshop" in Machalilla, Ecuador, on 12-17 June 2007, and a "Workshop on Seabird-Fishery Interactions" in Lima, Peru, on 19-25 June 2007. His travel expenses were paid by the World Wildlife Fund.

Dr. Richard B. Deriso participated in a meeting of the Scientific and Statistical Committee of the Western Pacific Fishery Management Council of the United States in

Honolulu, Hawaii, on 12-14 June 2007. His travel expenses were paid by the Western Pacific Fishery Management Council.

Mr. Alexandre Aires-da-Silva participated in a Data Preparatory Meeting of the Shark Species Group of the International Commission for the Conservation of Atlantic Tunas in Punta del Este, Uruguay, on 25-29 June 2007. His travel expenses were paid by two non-governmental organizations, Oceana and Shark Alliance.

DATA COLLECTION

The IATTC had field offices at Las Playas and Manta, Ecuador; Manzanillo and Mazatlan, Mexico; Panama, Republic of Panama; Mayaguez, Puerto Rico, USA; and Cumaná, Venezuela, during the second quarter of 2007.

Personnel at these offices collected 346 length-frequency samples from 218 wells and abstracted logbook information for 227 trips of commercial fishing vessels during the second quarter of 2007.

Also during the second 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, 129 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 2007 is about 229,100 cubic meters (m^3) (Table 1). The weekly average at-sea capacity for the fleet, for the weekly periods ending 2 April through 1 July, was about 164,800 m^3 (range: 148,800 to 180,500 m^3). The changes of flags and vessel names and additions to and deletions from the IATTC's fleet list during that period are given in Table 2.

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

Catch statistics

The estimated total retained catches of tunas in the EPO during the 1 January-1 July 2007 period, in metric tons (t), were:

Species	2007	2002-2006			Weekly average, 2007
		Average	Minimum	Maximum	
Yellowfin	105,900	181,900	111,800	229,300	4,100
Skipjack	112,400	116,700	88,300	144,900	4,300
Bigeye	29,500	20,400	13,000	30,500	1,100

Preliminary estimates of the retained catches, by species and by flag of vessel, are shown in Table 3.

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

The logbook data used in the analyses have been obtained with the cooperation of vessel owners and captains. The catch and effort measures used by the IATTC staff are based on fishing trips landing predominantly yellowfin, skipjack, bigeye, and bluefin tuna. The great majority of the purse-seine catches of yellowfin, skipjack, and bigeye are made by vessels with carrying capacities greater than 363 t, and only data for purse seiners with carrying capacities greater than 363 t are included herein for comparisons among years. There are now far fewer pole-and-line vessels than in previous years, so the data for these vessels are combined without regard to size classes. There are no adjustments included for other factors, such as type of set or vessel operating costs and market prices, which might identify whether a vessel was directing its effort toward a specific species.

Preliminary estimates of the catches per unit of effort (CPUEs), expressed as catches per day's fishing by purse seiners, of yellowfin (Table 4), skipjack (Table 5), and bigeye (Table 6) in the EPO during the first quarter of 2007 and the corresponding periods of 2002-2006, in metric tons, were:

Species	Region	2007	2002-2006		
			Average	Minimum	Maximum
Yellowfin	N of 5°N	9.4	17.3	9.1	29.5
	S of 5°N	2.0	6.3	2.8	8.9
Skipjack	N of 5°N	1.7	1.7	0.3	3.5
	S of 5°N	5.4	9.2	7.3	13.1
Bigeye	EPO	2.5	1.7	1.4	2.1

Catch statistics for the longline fishery

The catches of bigeye by longline gear in the EPO during the first and second quarters of 2007 are shown in Table 7. 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, its Annual Reports for 1954-2002, its Fishery Status Reports 1, 2, 3, and 4, and its Stock Assessment Reports 1-7.

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 first quarter of 2002-2007 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 first quarter of 2007, and the second shows the combined data for the first quarter of each year of the 2002-2007 period. Samples from 227 wells were taken during the first quarter of 2007. There were no reported catches made by pole-and-line vessels during the first quarter of 2007.

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 227 wells sampled during the first quarter of 2007, 163 contained yellowfin. The estimated size compositions of these fish are shown in Figure 2a. The majority of the yellowfin catch was taken by sets on unassociated schools in the North and South, and on schools associated with dolphins and with floating objects in the Inshore area. Small amounts of yellowfin were taken in floating-object sets in the Equatorial and Southern areas, and in association with dolphins in the Northern area.

The estimated size compositions of the yellowfin caught by all fisheries combined during the first quarter of 2002-2007 are shown in Figure 2b. The average weights of the fish caught during the first quarter of 2007 were greater than those caught during 2005 and 2006, but considerably less than those caught during 2002-2004.

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 227 wells sampled during the first quarter of 2007, 179 contained skipjack. The estimated size compositions of these fish are shown in Figure 3a. A large portion of the skipjack caught during the first quarter was taken in the Southern unassociated fishery. There were also significant catches of skipjack in the Equatorial, Inshore, and Southern floating-object fisheries. Small amounts of skipjack were taken in the Northern unassociated and floating-object fisheries, and in schools associated with dolphins.

The estimated size compositions of the skipjack caught by all fisheries combined during the first quarter of 2002-2007 are shown in Figure 3b. The average weights of skipjack caught during the first quarter of 2007 were greater than those caught during that period of four of the previous five years, the exception being 2004. Most of the fish caught were between 45 and 65 cm in length.

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 227 wells sampled during the first quarter of 2007, 49 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 South, with smaller catches in the Northern, Equatorial, and Inshore floating-object fisheries. A small amount of bigeye was caught in the unassociated fishery. There were no recorded catches of bigeye in sets on fish associated with dolphins or in the pole-and-line fishery.

The estimated size compositions of the bigeye caught by all fisheries combined during the first quarter of 2002-2007 are shown in Figure 4b. The average weight of bigeye caught during the first quarter of 2007 was less than those of four of the five previous years, the exception being 2003. Two distinct modes of fish, at about 35 to 55 cm and 65 to 85 cm, are evident, with smaller modes in the 90- to 100 cm and 120- to 130-cm ranges.

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).

In 2007 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 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 204 fishing trips aboard purse seiners covered by that program during the second quarter of 2007. Preliminary coverage data for these vessels during the quarter are shown in Table 8.

Training

An IATTC staff member participated as an instructor during the last week (23-27 April 2007) of a three-week observer training course conducted by the Programa Nacional de Observadores de Colombia (PRODELCO), which took place at the Universidad Nacional de Colombia in Bogotá. Fourteen students participated in the course.

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, except on 17-23 April, 5-23 May, and 4, 16-21, 23, and 28-30 June. Spawning occurred between 4:15 p.m. and 11:25 p.m. The numbers of eggs collected after each spawning event ranged from about 8,000 to 1,117,000. The water temperatures in the tank ranged from 25.9° to 28.4°C during the quarter.

Two males (46 and 58 kg) and four females (between 37 and 56 kg) died during the quarter. One of the males died from striking the tank wall and the other from unknown causes. Two of the females died from striking the tank wall and the other two from starvation. At the end of June there were 7 52- to 60-kg and 9 10- to 20-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 December five 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 June, all nine of the smaller fish and two of the seven larger fish in Tank 1 had archival 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 Autoridad de los Recursos Acuáticos de Panamá (ARAP).

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 spawned about twice each week during the quarter.

The second group consists of 25 individuals from a group bred at the Laboratory from eggs obtained from spawning in 1998.] These fish began spawning in late April, and continued to spawn about one time per week throughout the quarter.

Mr. Amado Cano of ARAP and members of the Achotines Laboratory staff continued with the simulated shipment trials described in the IATTC Quarterly Report for January-March 2007, using both eggs and yolk-sac larvae. A grant from the Secretaría Nacional de Ciencia, Tecnología e Innovación (SENACYT) of Panama covered the cost of these trials.

Visitors at the Achotines Laboratory

Dr. Rachel Collin, Director of the Bocas del Toro Research Station of the Smithsonian Tropical Research Institute (STRI), and Dr. Antonio Baeza, a STRI post-doctoral fellow, spent the period of 16-17 April 2007, at the Achotines Laboratory, where they surveyed Achotines Bay and the adjacent coastline for invertebrates.

Mr. Michael Barry and a production crew from “Reel Adventures,” a sportfishing program broadcast on the Fox Sports Network, visited the Achotines Laboratory on17 April 2007 to film sequences for inclusion in that program.

Dr. Stephen W. Pacala, Frederick D. Petrie Professor in the Department of Ecology and Evolutionary Biology at Princeton University, taught a portion of his Coral Reef Ecology field course at the Achotines Laboratory. The 21-person group spent the period of 28 April-2 May 2007 at the Laboratory.

Dr. Darryl Jory, editor of Global Aquaculture Alliance Advocate magazine, and Mr. Ricardo Arias, International Division Manager for Aquatic Eco-Systems (an aquaculture supply company) paid a courtesy visit to the Achotines Laboratory on 29 June 2007.

Dolfin studies

Estimates of the mortality of dolphins due to fishing

The preliminary estimate of the incidental mortality of dolphins in the fishery in 2006 is 886 animals (Table 9), a substantial decrease relative to the 1,151 mortalities recorded in 2005. The mortalities for 1979-2006, by species and stock, are shown in Table 10, and the standard errors of these estimates are shown in Table 11. The estimates for 1979-1992 are based on a mortality-per-set ratio. The estimates for 1993-1994 are based on the sums of the IATTC species and stock tallies and the total dolphin mortalities recorded by the Mexican program, prorated to species and stock. The mortalities for 1995-2006 represent the sums of the observed species and stock tallies recorded by the IATTC and national programs. The mortalities for 2001-2003 have been adjusted for unobserved trips of vessels with carrying capacities greater than 363 metric tons. The sums of the estimated mortalities for the northeastern and western-southern stocks of offshore spotted dolphins are not necessarily equal to those for the previous stocks of northern and southern offshore dolphins because the estimates for the two stock groups are based on different areal strata, and the mortalities per set and the total numbers of sets vary spatially. The mortalities of the principal dolphin species affected by the fishery show declines in the last decade (Figure 5) similar to that for the mortalities of all dolphins combined (Figure 6). Estimates of the abundances of the various stocks of dolphins and the relative mortalities (mortality/abundance) are also shown in Table 9. The stocks with the highest levels of relative mortality were eastern spinner dolphin, whitebelly spinner dolphin, and northern common dolphin (all 0.03 percent).

The number of sets on dolphin-associated schools of tuna made by vessels with carrying capacities greater than 363 metric tons decreased by 27 percent, from 12,173 in 2005 to 8,923 in 2006, and this type of set accounted for 36 percent of the total number of sets made by such vessels in 2006, compared to 48 percent in 2005. The average mortality per set was 0.10 dolphins in 2006, compared to 0.09 dolphins in 2005. The trends in the numbers of sets on dolphin-associated fish, mortality per set, and total mortality in recent years are shown in Figure 6.

The catches of dolphin-associated yellowfin decreased from 165,131 metric tons (t) in 2005 to 89,183 t in 2006, a decrease of 46 percent. The percentage of the catch of yellowfin taken in sets on dolphins decreased from 61 percent of the total catch in 2005 to 53 percent of the total catch in 2006, and the average catch of yellowfin per set on dolphins decreased from 14 to 10 t. The mortality of dolphins per metric ton of yellowfin caught increased from 0.0070 in 2005 to 0.0099 in 2006.

Causes of the mortality of dolphins

The above figures are based on data from trips covered by observers from all components of the On-Board Observer Program. The comparisons in the next paragraph are based on the IATTC data bases for 1986-2005 only.

The decrease in the mortality per set is the result of actions by the fishermen to better manage the factors that bring about incidental mortalities of dolphins. Indicative of this effort is the number of sets in which no mortalities occurred, which has increased from 38 percent in 1986 to 94 percent in 2006, and the average number of animals left in the net after backdown, which has decreased from 6.0 in 1986 to less than 0.1 in 2006 (Table 12). The factors under the control of the fishermen that are likely to affect the mortality of dolphins per set include the occurrence of malfunctions, especially those that lead to net canopies and net collapses, and the time it takes to complete the backdown maneuver (Table 12). The percentage of sets with major mechanical malfunctions has decreased from an average of approximately 11 percent during the late 1980s to less than 6 percent during 1998-2006; during the same period the percentage of sets with net collapses decreased from about 30 percent to less than 5 percent, on average, and that of net canopies from about 20 percent to less than 5 percent, on average. Although the chance of dolphin mortality increases with the duration of the backdown maneuver, the average backdown time has changed little since 1986. Also, the mortality of dolphins per set increases with the number of animals in the encircled herd, in part because the backdown maneuver takes longer to complete when larger herds are encircled. The fishermen could reduce the mortalities per set by encircling schools of fish associated with fewer dolphins.

Distribution of fishing effort

The spatial distributions of sets on tunas associated with dolphins in 2005 and 2006 by vessels carrying observers are shown in Figure 7. The patterns for the two years are largely similar.

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 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 the first quarter. 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 persisted in April, extending as far eastward as 100°W, but its area decreased considerably in May and it was absent in June. 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. The SSTs were more than 1°C above normal along the equator from near the coast to about 170°E throughout the fourth quarter. In addition, there were areas of warm water off northern and central Mexico and in a few other scattered areas during that quarter (IATTC Quarterly Report for October-December 2006: Figure 11). During January 2007 there was a narrow strip of warm water extending along the equator from the Galapagos Islands to about 130°W and an area of cool water off Mexico at about 10°N. In February the former was replaced by a narrow strip of cool water extending from about 120°W to about 135°W. The latter persisted in February. An area of warm water appeared off northern Chile during that month. In March a narrow band of cool water extended along the equator from the coast to about 110°W. This band of cool water persisted during April, May, and June, and it extended southward along the coast of South America, reaching 40°S in June. Scattered areas of warm and cool water appeared offshore, particularly in May and June (Figure 8). The data in Table 13 are mixed, but overall they are indicative of transition from a weak El Niño event to an anti-El Niño event. Most notably, the thermocline was shallow along the equator at 80°W and 110°W. No patterns are evident in the data for the SOIs, SOI*s, and NOI*s. However, the SOI* value for May, 5.50, is the fourth-greatest value on record, being exceeded only by the values for July and August 1955 (6.47 and 6.68, respectively) and May 1956 (8.66). (The series of data for NOI* extends from January 1948 to June 2007.) According to the Climate Diagnostics Bulletin of the U.S. National Weather Service for June 2007, "ENSO-neutral conditions are expected to continue during the next 2 months, with ENSO-neutral or [anti-El Niño] conditions equally likely thereafter."

GEAR PROGRAM

During the second quarter an IATTC staff member participated in one 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 (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 second 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
April	17	17	6,282	550	0
May	14	13	1,574	600	100
June	16	16	3,182	450	48
Total	47	46	11,038	1,600	148

INTER-AGENCY COOPERATION

Mr. Vernon P. Scholey was appointed, by Executive Decree No. 82, signed by the President of Panama, Martín Torrijos Espino, on 13 April 2007, as one of five members of the Board of Directors of the Secretaría Nacional de Ciencia, Tecnología e Innovación (SENACYT).

Dr. Mark N. Maunder taught classes for Dr. George Sugihara's course, "Quantitative Theory of Populations and Communities," at Scripps Institution of Oceanography on 17 and 19 April 2007.

Mr. Kurt M. Schaefer spent the period of 21-30 April 2007, at the University of Cadiz, Spain, where he presented two seminars to faculty members and graduate students. The first seminar was on research on life history, primarily growth and reproduction, of tunas, and the second was on movements, behavior, and habitat utilization of tropical tunas in the eastern Pacific Ocean. Several meetings and discussions were held with faculty members and graduate students regarding current and future electronic tagging studies on bigeye and bluefin tunas in the Pacific and Atlantic Oceans. A large portion of his expenses was paid by the University of Cadiz.

The University of Miami and the IATTC held their fifth workshop on "Physiology and Aquaculture of Pelagics, with Emphasis on Reproduction and Early Developmental Stages of Yellowfin Tuna" on 11-22 June 2007. The organizers and instructors 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. The participants were Dr. Carlos Gómez Galindo of the University of Guadalajara, Dr. Fernando de la Gándara of the Instituto Español de Oceanografía, Ms. Nicole Kirchhoff of the Center for Cooperative Aquaculture Research at the University of Maine, Dr. Nikos Papandroulakis of the Hellenic Center for Marine Research in Greece, Dr. Paul Troy of Hawaii Oceanic Technology, and Mr. Stephen Van Kampen-Lewis, a graduate student at the University of Hawaii. Messrs. Marcell Boaventura, Fabricio Guimarães Vidal, Ronald Hoenig, and Aaron Welch, all graduate students of Dr. Benetti, also participated in the workshop. 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 larvae were cultured from the egg stage through the second week of feeding. (Some larval cultures were initiated prior to the workshop.) In addition, experimental trials were conducted to examine the effects of dilute (50 parts per million) formalin treatment and extended photoperiod (18 h of light) on the growth and survival of yellowfin larvae. Samples from these trials will be analyzed during the third quarter.

PUBLICATIONS

IATTC publication

Margulies, Daniel, Vernon P. Scholey, Jeanne B. Wexler, Robert J. Olson, Jenny M Suter, and Sharon L. Hunt. 2007. A review of IATTC research on the early life history and reproductive biology of scombrids conducted at the Achotines Laboratory from 1985 to 2005. Inter-Amer. Trop. Tuna Comm., Spec. Rep., 16: 63 pp.

Outside journals

Lennert-Cody, Cleridy E., and Richard A. Berk. 2007. Statistical learning procedures for monitoring regulatory compliance: an application to fisheries data. Jour. Royal Stat. Soc. A, 170 (3): 671-689.

Margulies, Daniel, Jenny M. Suter, Sharon L. Hunt, Robert J. Olson, Vernon P. Scholey, Jeanne B. Wexler, and Akio Nakazawa. 2007. Spawning and early development of captive yellowfin tuna (*Thunnus albacares*). U.S. Nat. Mar. Fish. Serv., Fish. Bull., 105 (2): 249-265.

Sibert, John, John Hampton, Pierre Kleiber, and Mark Maunder. 2007. [response to a letter by Douglas J. McCauley to Science]. Science, 316 (5822): 201.

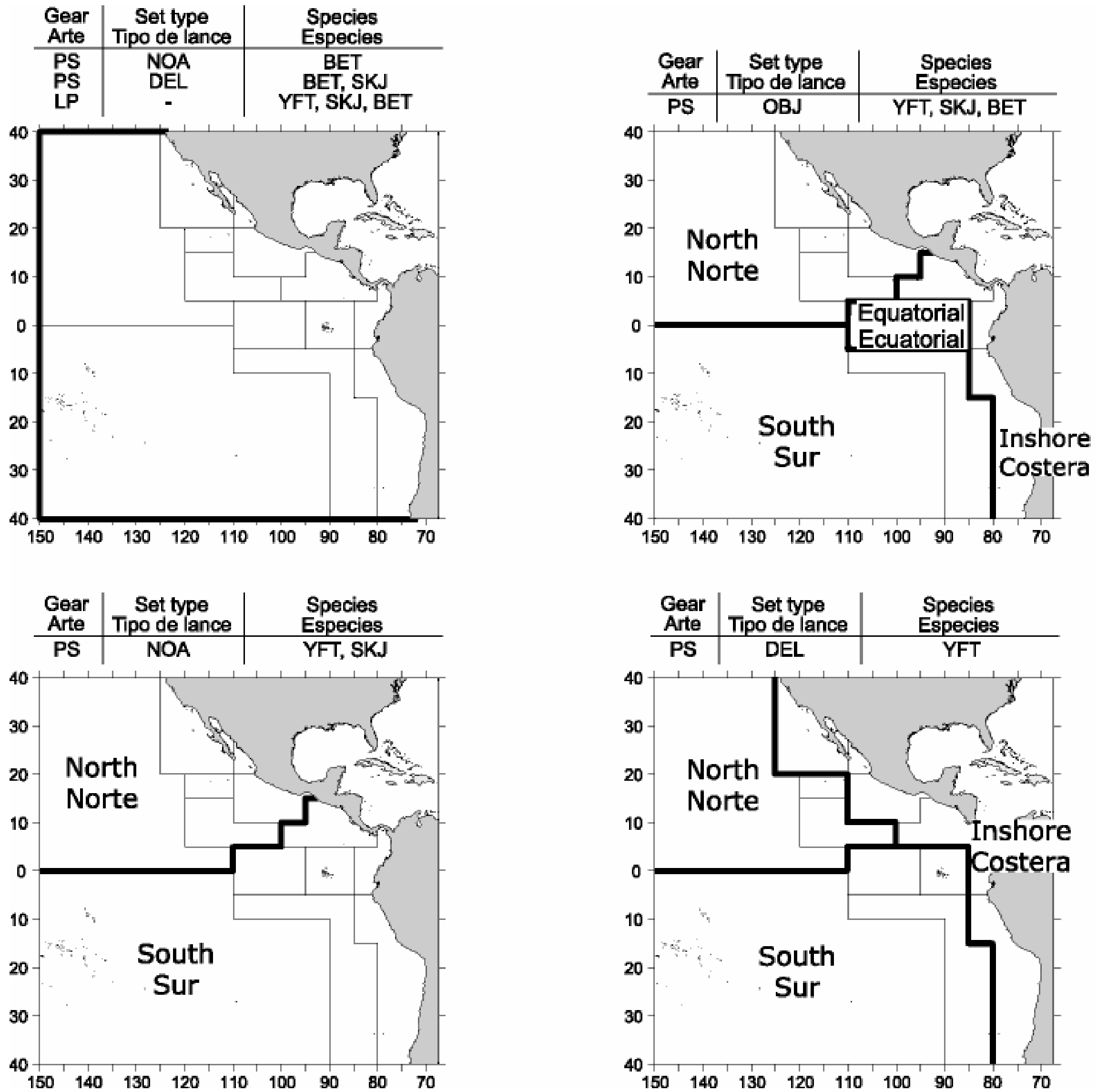

FIGURE 1. Spatial extents of the fisheries defined by the IATTC staff for stock assessment of yellowfin, skipjack, and bigeye in the EPO. The thin lines indicate the boundaries of the 13 length-frequency sampling areas, and the bold lines the boundaries of the fisheries. Gear: PS = purse seine, LP =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

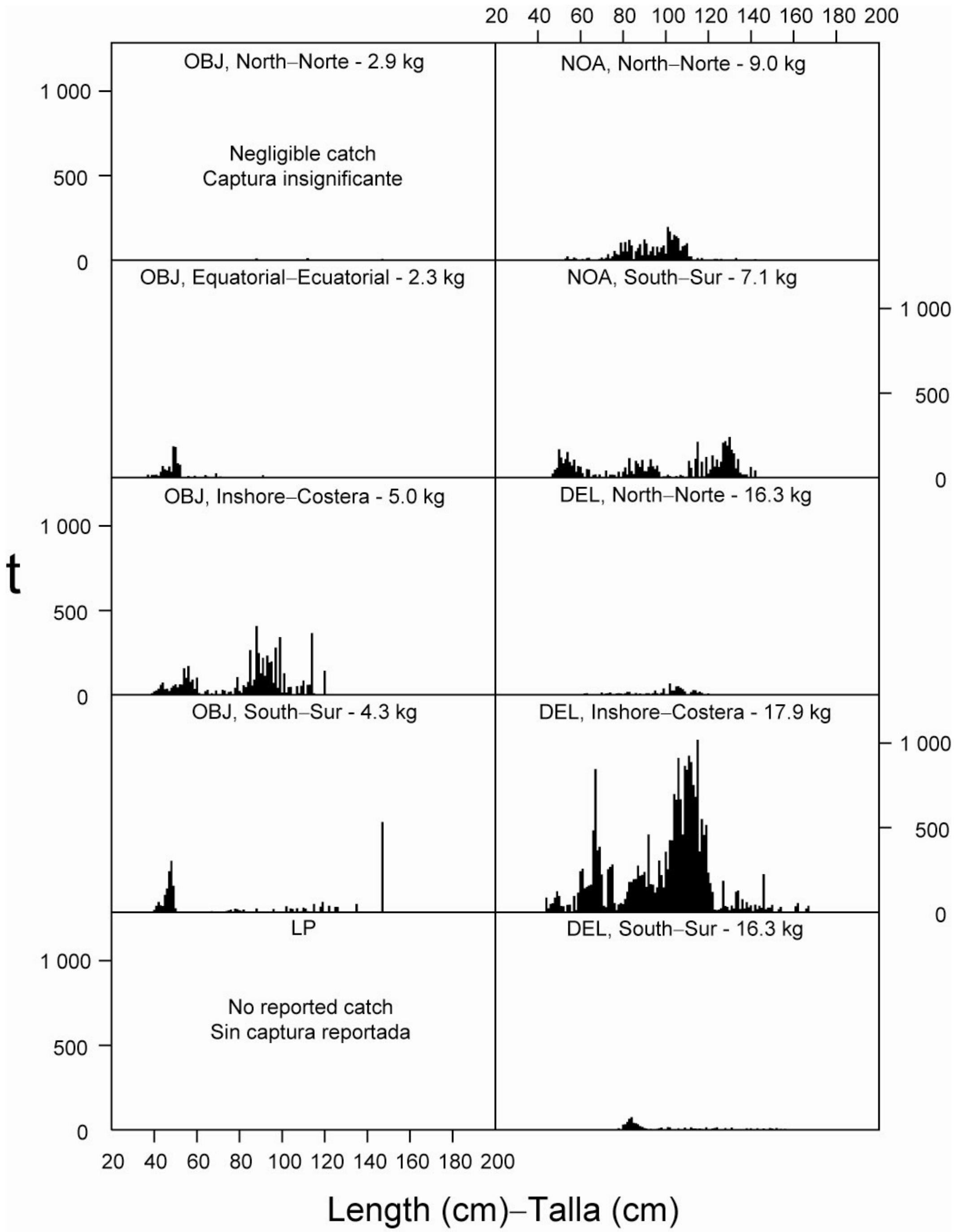

FIGURE 2a. Estimated size compositions of the yellowfin caught in each fishery of the EPO during the first quarter of 2007. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons; OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin.

FIGURA 2a. Composición por tallas estimada para el aleta amarilla capturado en cada pesquería del OPO durante el primer trimestre de 2007. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas; OBJ = objeto flotante; LP = caño; NOA = unassociated; DEL = delfín.

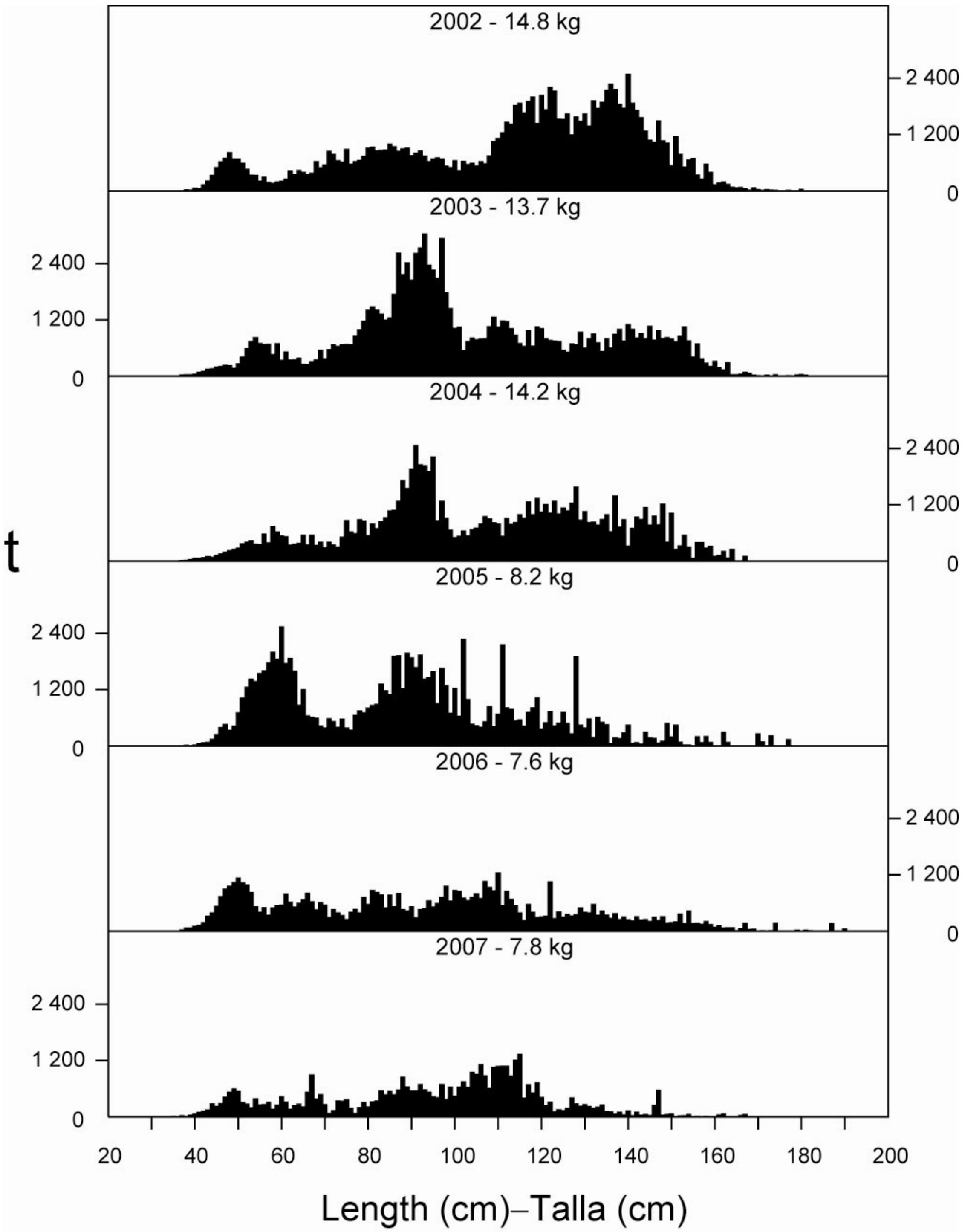

FIGURE 2b. Estimated size compositions of the yellowfin caught in the EPO during the first quarter of 2002-2007. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.
FIGURA 2b. Composición por tallas estimada para el aleta amarilla capturado en el OPO en el primer trimestre de 2002-2007. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas.

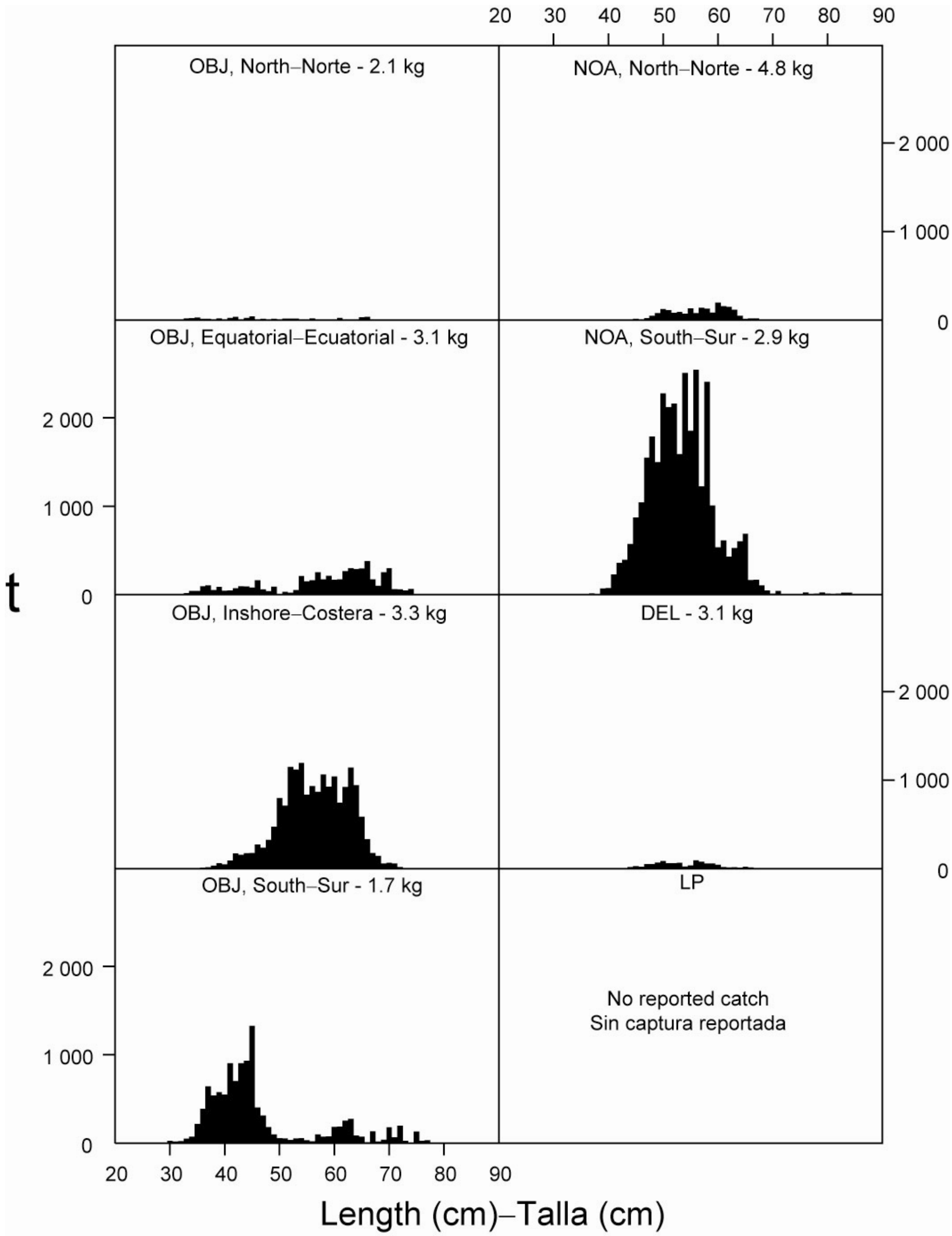

FIGURE 3a. Estimated size compositions of the skipjack caught in each fishery of the EPO during the first quarter of 2007. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons; OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin.

FIGURA 3a. Composición por tallas estimada para el barrilete capturado en cada pesquería del OPO durante el primer trimestre de 2007. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas; OBJ = objeto flotante; LP = caño; NOA = unassociated; DEL = delfín.

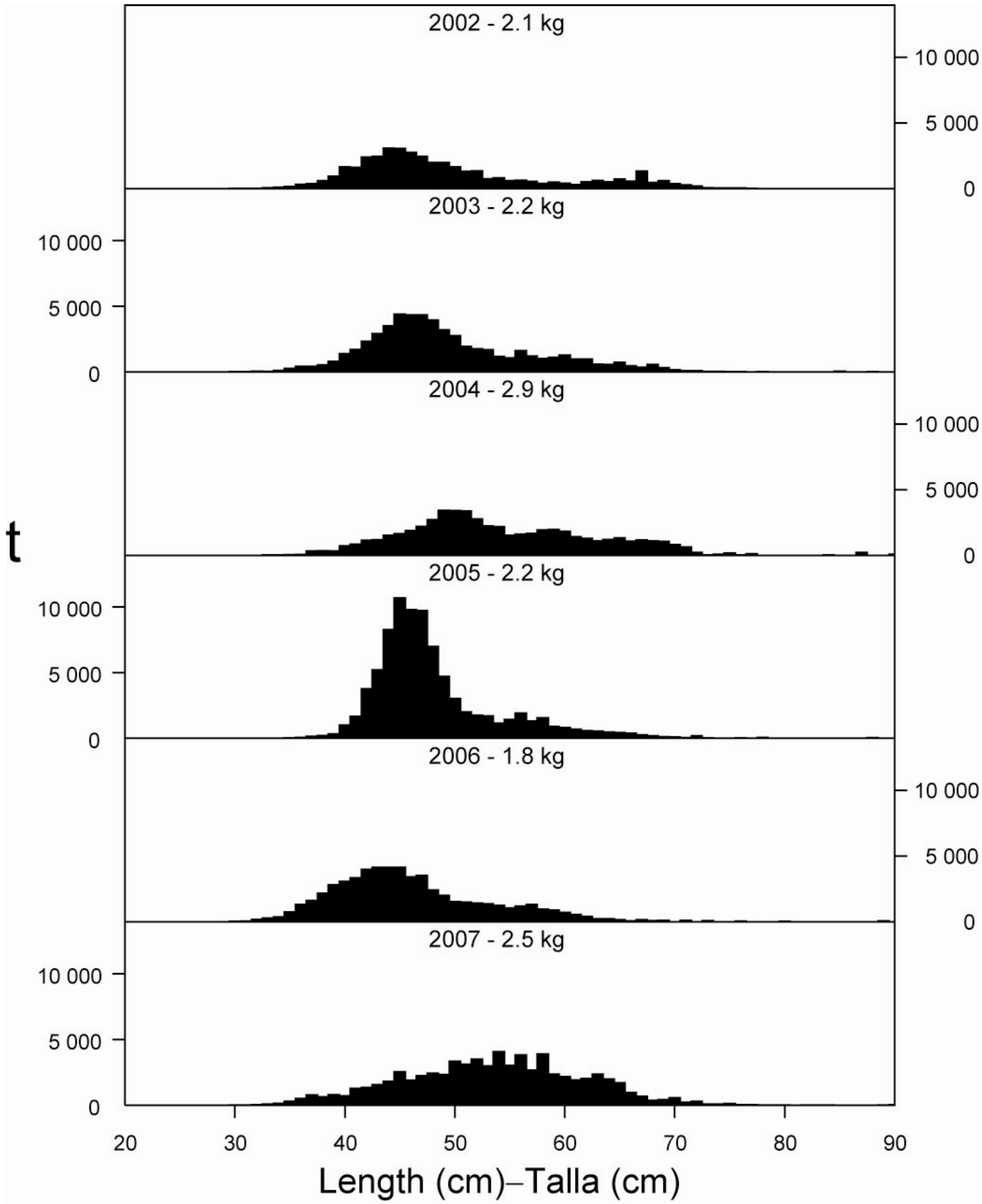

FIGURE 3b. Estimated size compositions of the skipjack caught in the EPO during the first quarter of 2002-2007. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 3b. Composición por tallas estimada para el barrilete capturado en el OPO en el cuarto trimestre de 2002-2007. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas.

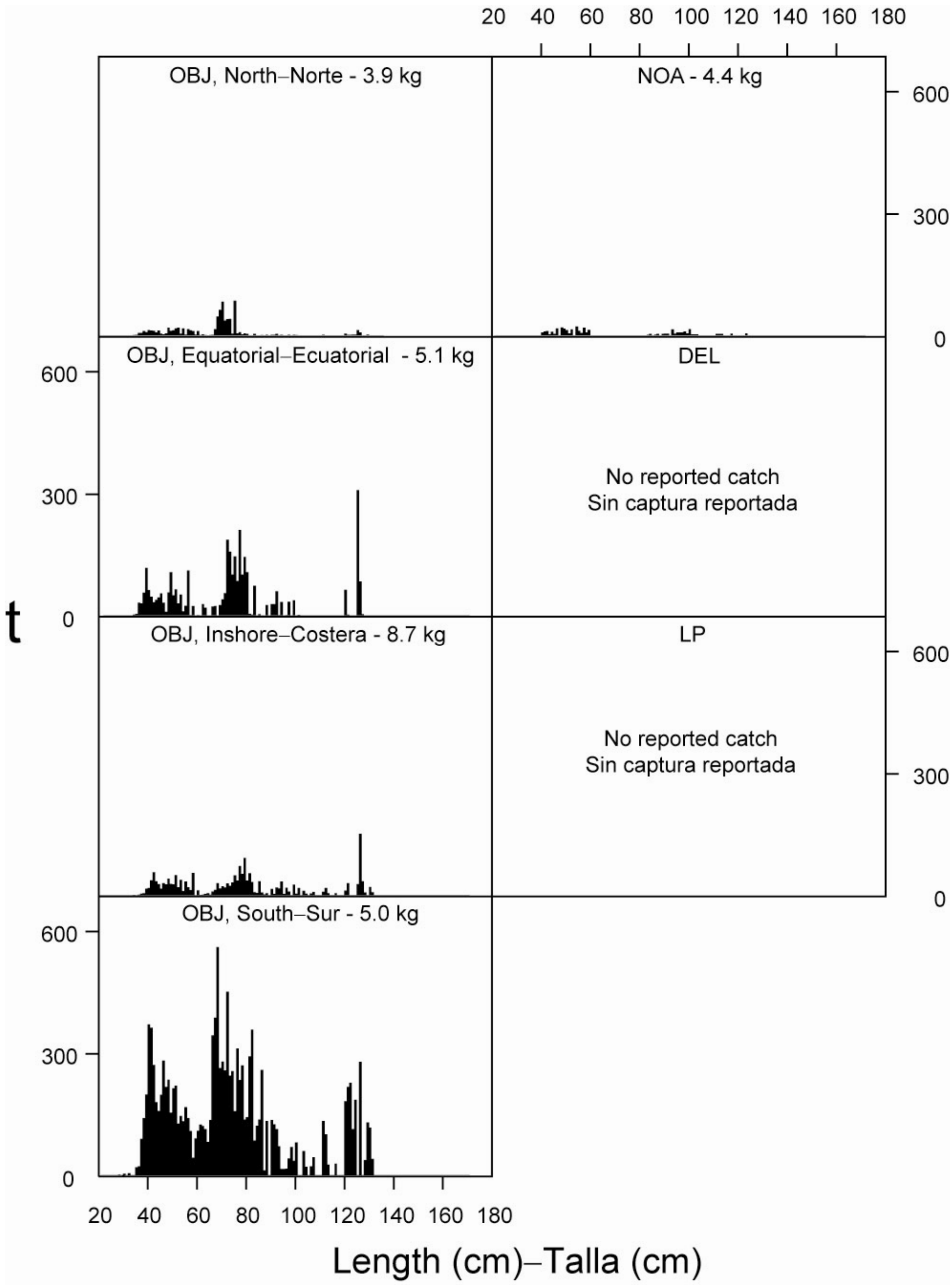

FIGURE 4a. Estimated size compositions of the bigeye caught in each fishery of the EPO during the first quarter of 2007. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons; OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin.

FIGURA 4a. Composición por tallas estimada para el patudo capturado en cada pesquería del OPO durante el primer trimestre de 2007. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas; OBJ = objeto flotante; LP = caño; NOA = unassociated; DEL = delfín.

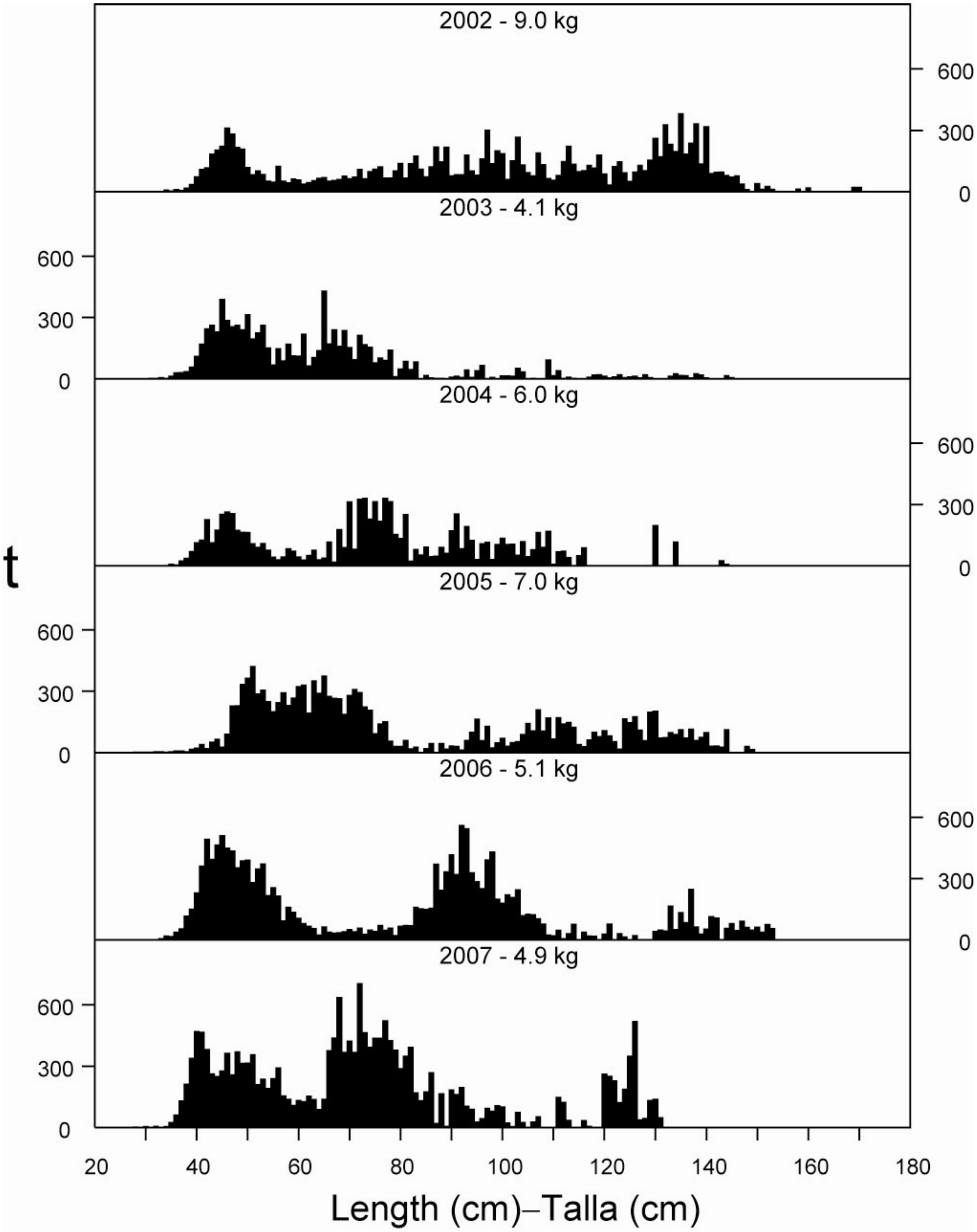

FIGURE 4b. Estimated size compositions of the bigeye caught in the EPO during the first quarter of 2002-2007. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 4b. Composición por tallas estimada para el patudo capturado en el OPO en el primer trimestre de 2002-2007. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas.

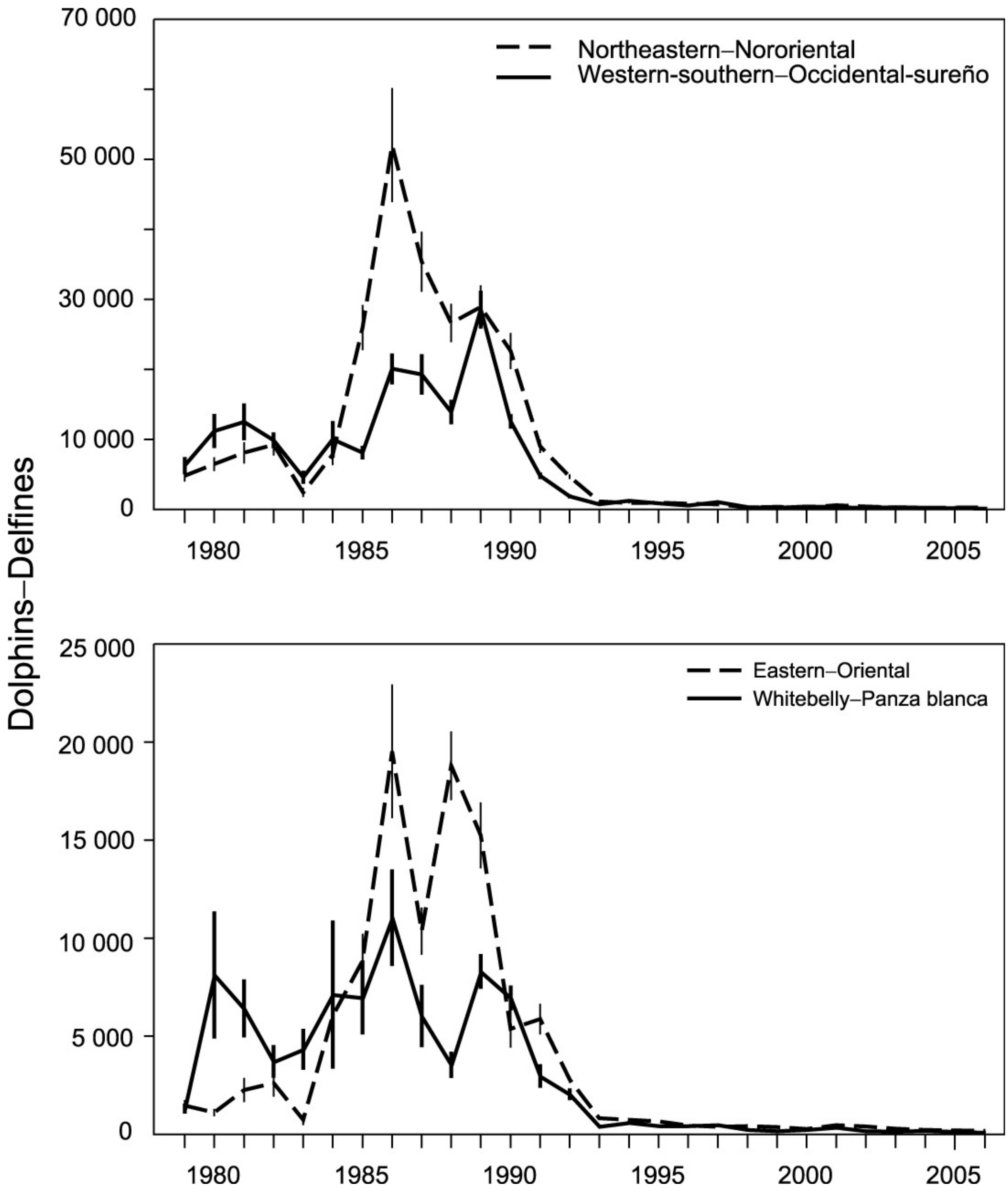

FIGURE 5. Estimated numbers of mortalities for the stocks of spotted (upper panel) and spinner (lower panel) dolphins in the EPO. Each vertical line represents one positive and one negative standard error.

FIGURA 5. Número estimado de mortalidades para los stocks de delfines manchado (panel superior) y tornillo (panel inferior) en el OPO. Cada línea vertical representa un error estándar positivo y un error estándar negativo.

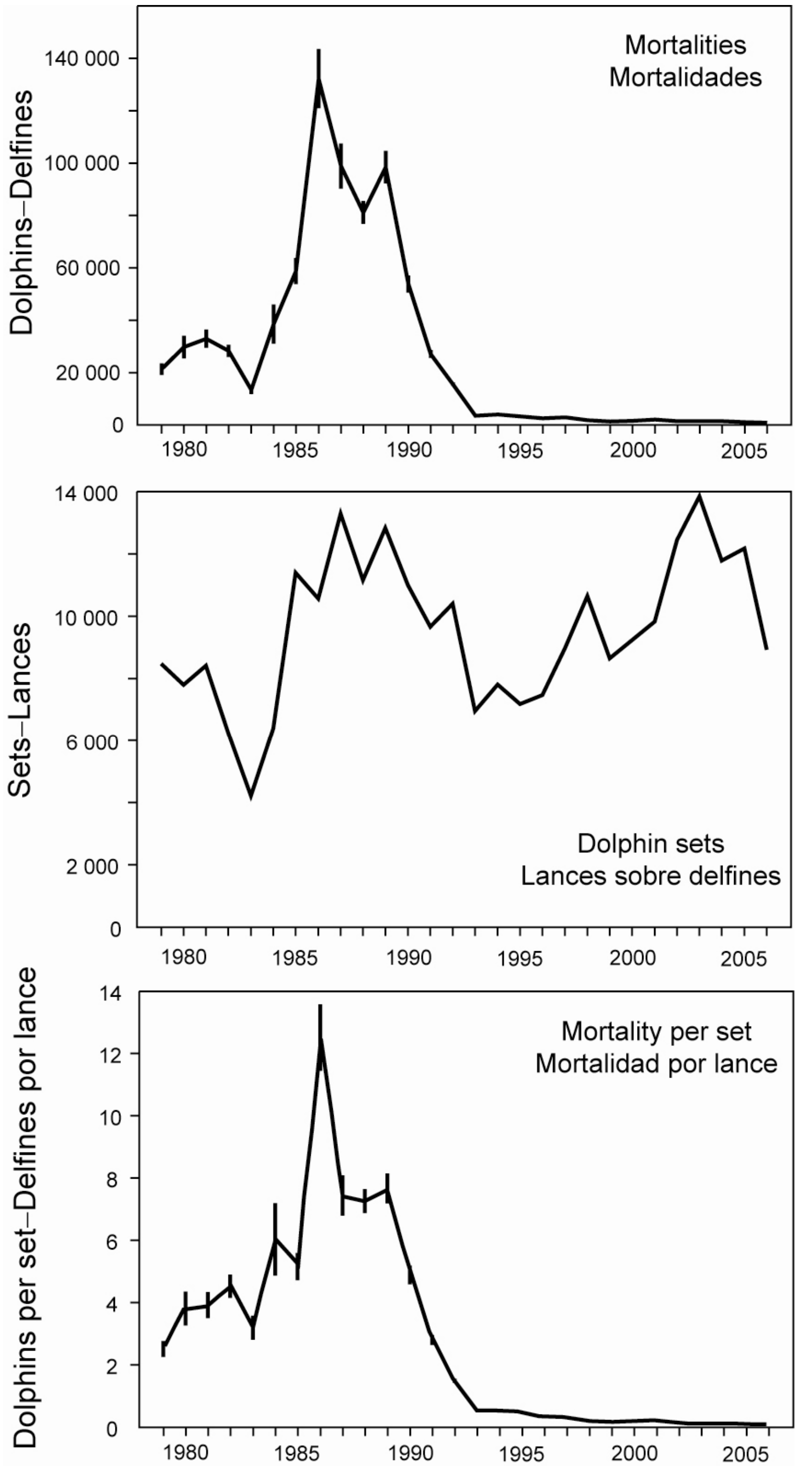

FIGURE 6. Estimated numbers of sets on tunas associated with dolphins, dolphin mortalities per set, and total mortalities of dolphins due to fishing in the EPO. Each vertical line represents one positive and one negative standard error.
FIGURA 6. Número estimado de lances sobre atunes asociados con delfines, mortalidades de delfines por lance, y mortalidad total de delfines causada por la pesca en el OPO. Cada línea vertical representa un error estándar positivo y un error estándar negativo.

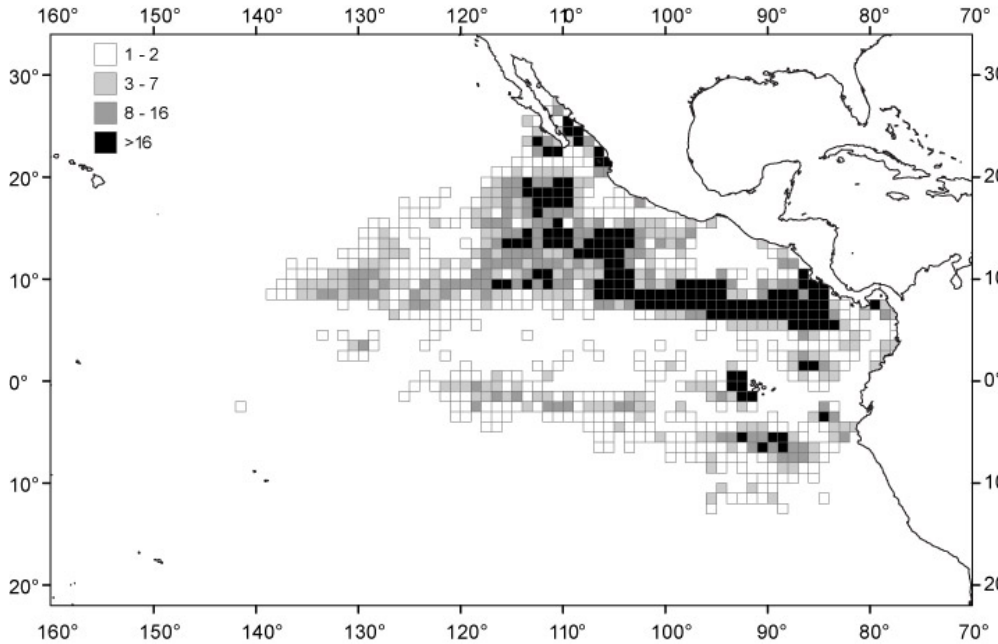

FIGURE 7a. Spatial distribution of the average mortality of dolphins per set for all stocks combined, 2005.
FIGURA 7a. Distribución de la mortalidad media de delfines por lance para todas las poblaciones combinadas, 2005.

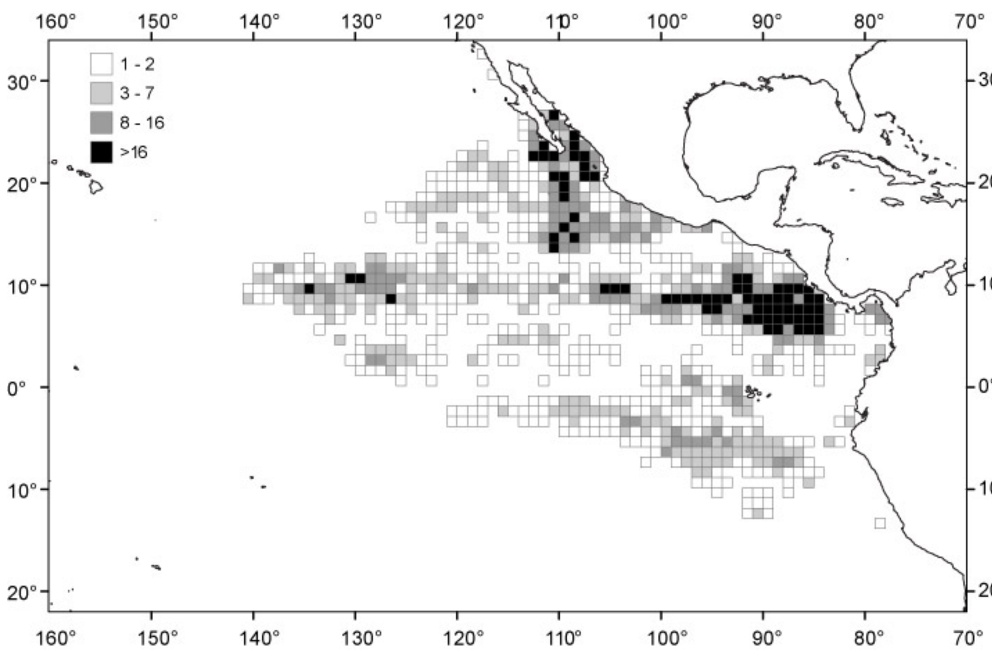

FIGURE 7b. Spatial distribution of the average mortality of dolphins per set for all stocks combined, 2006.
FIGURA 7b. Distribución de la mortalidad media de delfines por lance para todas las poblaciones combinadas, 2006

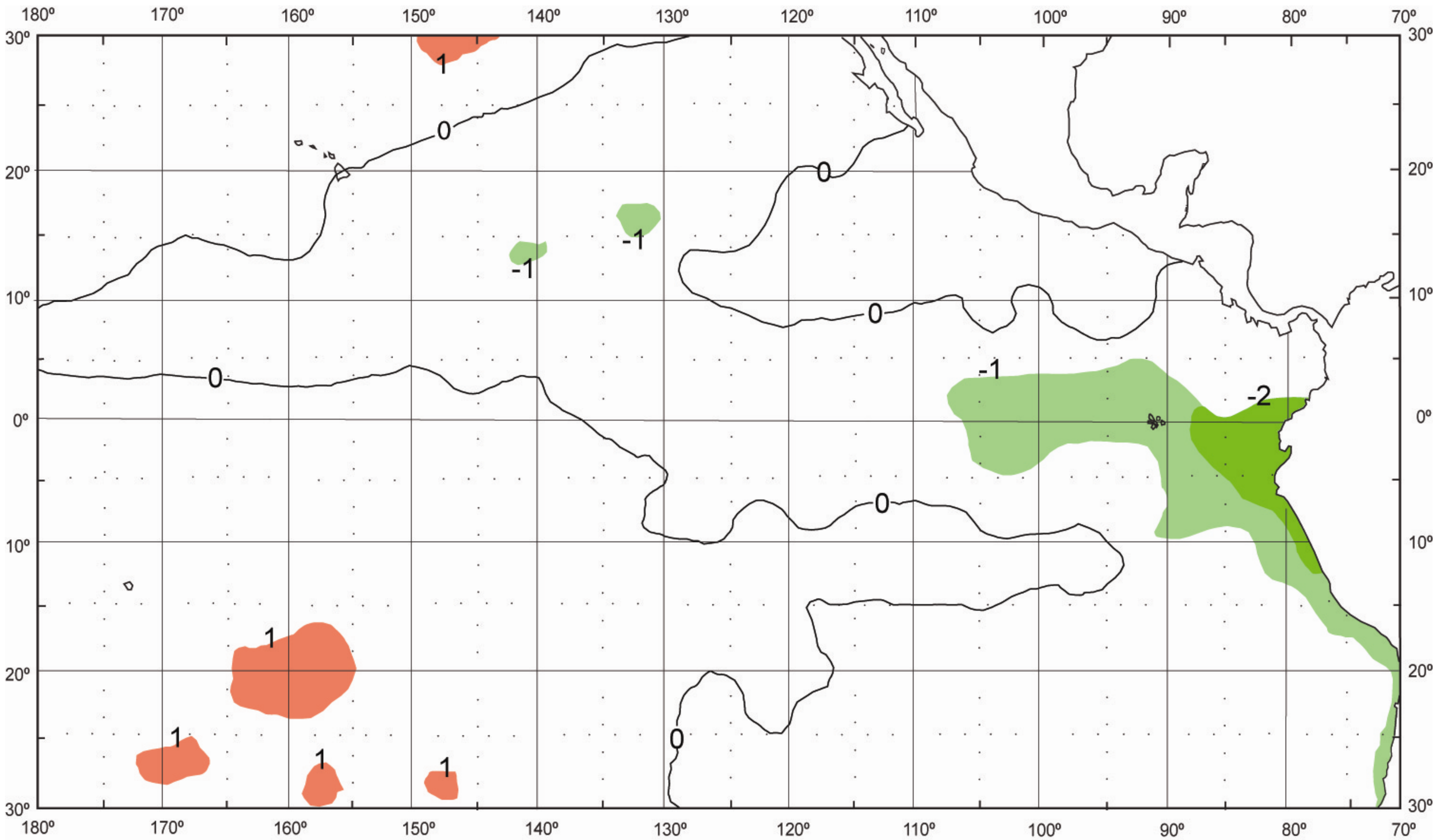

FIGURE 8. Sea-surface temperature (SST) anomalies (departures from long-term normals) for June 2007, based on data from fishing boats and other types of commercial vessels.

FIGURA 8. Anomalías (variaciones de los niveles normales a largo plazo) de la temperatura superficial del mar (TSM) en junio de 2007, 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 2007 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 2007, 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	Gear	Well volume–Volumen de bodega				Capacity
Bandera	**Arte**	**1-900**	**901-1700**	**>1700**	**Total**	**Capacidad**
			Number—Número			
Bolivia	PS	1	-	-	1	222
Colombia	PS	3	10	-	13	14,439
Ecuador	PS	61	15	8	84	57,291
España—Spain	PS	-	-	3	3	6,955
Guatemala	PS	-	1	-	1	1,475
Honduras	PS	1	2	-	3	2,729
México	PS	23	34	1	58	58,001
	LP	4	-	-	4	498
Nicaragua	PS	-	5	-	5	6,024
Panamá	PS	5	17	6	28	38,781
El Salvador	PS	-	1	3	4	7,415
USA—EE.UU.	PS	1	2	-	3	3,288
Venezuela	PS	-	20	2	22	29,577
Vanuatu	PS	1	1	-	2	2,163
Unknown—Desconocida	PS	1	-	-	1	285
All flags—	PS	97	108	23	228	
Todas banderas	LP	4	-	-	4	
	PS + LP	101	108	23	232	
			Capacity—Capacidad			
All flags—	PS	42,457	138,653	47,535	228,645	
Todas banderas	LP	498	-	-	498	
	PS + LP	42,955	138,653	47,535	229,143	

TABLE 2. Changes in the IATTC fleet list recorded during the second quarter of 2007. PS = purse seine; LP = pole-and-line.
TABLA 2. Cambios en la flota observada por la CIAT registrados durante el segundo trimestre de 2007. PS = cerquero; LP = cañero.

Vessel name	Flag	Gear	Capacity (m^3)	Remarks
Nombre del buque	**Bandera**	**Arte**	**Capacidad (m^3)**	**Comentarios**
Vessels added to the fleet—Buques añadidos a la flota				
Re-entries—Reingresos				
				Now—Ahora
José Antonio	Ecuador	PS	142	*Danilo C*
Atun VII	México	PS	751	
San José	México	PS	251	
Donna B	USA	PS	170	
Changes of name or flag—Cambios de nombre o pabellon				
				Now—Ahora
Western Pacific I	Ecuador	PS	274	*Doménica L*
Gabriela F	Panamá	PS	1,449	*Aracely F*
Marinero I	Panamá	PS	1,244	*Marinero F*

TABLE 3. Preliminary estimates of the retained catches of tunas in the EPO from 1 January through 1 July 2007, by species and vessel flag, in metric tons.
TABLA 3. Estimaciones preliminares de las capturas retenidas de atunes en el OPO del 1 de enero al 1 de julio 2007, 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	11,123	48,323	15,608	-	1,008	-	-	207	76,269	30.0
Honduras	709	2,274	1,740	-	-	-	-	-	4,723	1.9
México	43,654	11,842	68	1,144	3,108	-	894	33	60,743	23.9
Nicaragua	2,898	1,833	733	-	-	-	-	-	5,464	2.1
Panamá	17,282	13,798	4,622	-	23	-	-	5	35,730	14.1
Venezuela	14,162	15,569	1,660	-	-	-	1	-	31,392	12.3
Other—Otros[2]	16,110	18,735	5,105	-	-	-	25	-	39,975	15.7
Total	105,938	112,374	29,536	1,144	4,139	-	920	245	254,296	

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

TABLE 4. Logged catches and catches per day's fishing[1] (CPDF) of yellowfin in the EPO, in metric tons, during the period of 1 January-31 March, based on fishing vessel logbook information.
TABLA 4. Captura registrada y captura por día de pesca[1] (CPDP) de aleta amarilla en el OPO, en toneladas métricas, durante el período de 1 de enero-31 de marzo, basado en información de los cuadernos de bitácora de buques pesqueros.

Area	Fishery statistic Estadística de pesca	Year-Año					
		2002	2003	2004	2005	2006	2007[2]
Purse seine—Red de cerco							
North of 5°N	Catch—Captura	56,200	65,500	31,900	39,700	24,600	17,800
Al norte de 5°N	CPDF—CPDP	29.5	22.5	11.8	13.7	9.1	9.4
South of 5°N	Catch—Captura	24,900	19,300	42,400	24,200	11,000	1,600
Al sur de 5°N	CPDF—CPDP	7.3	5.8	8.9	6.9	2.8	2.0
Total	Catch—Captura	81,100	84,800	74,300	63,900	35,600	19,400
	CPDF—CPDP	22.7	18.7	10.1	11.1	7.2	8.8
Annual total Total anual	Catch—Captura	261,800	275,100	192,800	162,600	94,800	
Pole and line—Cañero							
Total	Catch—Captura	100	<100	<100	200		
	CPDF—CPDP	.9	.1	1.8	3.0		
Annual total	Catch—Captura	800	500	1,800	800	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 5. Logged catches and catches per day's fishing[1] (CPDF) of skipjack in the EPO, in metric tons, during the period of 1 January-31 March, based on fishing vessel logbook information.
TABLA 5. Captura registrada y captura por día de pesca[1] (CPDP) de barrilete en el OPO, en toneladas métricas, durante el período de 1 de enero-31 de marzo, basado en información de los cuadernos de bitácora de buques pesqueros.

Area	Fishery statistic Estadística de pesca	Year-Año					
		2002	**2003**	**2004**	**2005**	**2006**	**2007[2]**
Purse seine—Red de cerco							
North of 5°N	Catch—Captura	600	5,800	4,100	10,300	3,000	3,100
Al norte de 5°N	CPDF—CPDP	.3	2.0	1.5	3.5	1.1	1.7
South of 5°N	Catch—Captura	26,600	33,900	36,500	46,000	28,600	4,300
Al sur de 5°N	CPDF—CPDP	7.8	10.1	7.7	13.1	7.3	5.4
Total	Catch—Captura	27,200	39,700	40,600	56,300	31,600	7,400
	CPDF—CPDP	7.6	8.9	7.1	11.3	6.7	3.8
Annual total Total anual	Catch—Captura	84,300	155,200	132,000	148,900	132,100	
Pole and line—Cañero							
Total	Catch—Captura	200		<100	<100		
	CPDF—CPDP	1.2		1.9			
Annual total	Catch—Captura	500	500	500	400	300	

[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 bigeye in the EPO, in metric tons, during the period of 1 January-31 March, based on purse-seine vessel logbook information.

TABLA 6. Captura registrada y captura por día de pesca[1] (CPDP) de patudo en el OPO, en toneladas métricas, durante el período de 1 de enero-31 de marzo, basado en información de los cuadernos de bitácora de buques cerqueros.

Fishery statistic—Estadística de pesca	**Year—Año**					
	2002	**2003**	**2004**	**2005**	**2006**	**2007[2]**
Catch—Captura	7,400	5,800	7,200	6,100	8,100	2,000
CPDF—CPDP	2.1	2.0	1.4	1.4	1.9	2.5
Total annual catch—Captura total anual	26,700	33,100	43,100	28,500	30,300	

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 7. Catches of bigeye tuna in the eastern Pacific Ocean during 2007 by longline vessels.
TABLA 7. Captures de atún patudo en el Océano Pacífico oriental durante 2007 por buques palangreros.

	First quarter	Month			Second quarter	Total to date
		4	5	6		
	Primer trimestre	Mes			Segundo trimestre	Total al fecha
		4	5	6		
China	-	-	-	-	-	-
European Union—Unión Europea	-	-	-	-	-	-
Japan—Japón	3,272	1,044	932	899	2,875	6,147
Republic of Korea—República de Corea	1,826	-	-	-	-	1,826
Chinese Taipei—Taipei Chino	1,096	272	-	-	272	1,368
USA—EE.UU.	105	3	5	2	10	115
Vanuatu	187	18	35	-	53	240
Total	6,486	1,337	972	901	3,210	9,696

TABLE 8. 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 second quarter of 2007. The numbers in parentheses indicate cumulative totals for the year.

TABLA 8. 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 segundo trimestre de 2007. 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	12	(31)	4	(13)	8	(18)	12	(31)	100.0	(100.0)
Ecuador	59	(150)	36	(100)	23	(50)	59	(150)	100.0	(100.0)
España—Spain	4	(11)	1	(6)	3	(5)	4	(11)	100.0	(100.0)
Guatemala	1	(3)	1	(3)			1	(3)	100.0	(100.0)
Honduras	4	(10)	4	(10)			4	(10)	100.0	(100.0)
México	61	(124)	29	(62)	32	(62)	61	(124)	100.0	(100.0)
Nicaragua	3	(10)	2	(6)	1	(4)	3	(10)	100.0	(100.0)
Panamá	29	(67)	14	(34)	15	(33)	29	(67)	100.0	(100.0)
El Salvador	7	(18)	7	(18)			7	(18)	100.0	(100.0)
U.S.A.—EE.UU.	2	(4)	2	(4)			2	(4)	100.0	(100.0)
Venezuela	19	(56)	11	(29)	8	(27)	19	(56)	100.0	(100.0)
Vanuatu	3	(6)	3	(6)			3	(6)	100.0	(100.0)
Total	204	(490)[1]	114	(291)	90	(199)	204	(490)	100.0	(100.0)

[1] Includes 49 trips (26 by vessels with observers from the IATTC program and 23 by vessels with observers from the national programs) that began in late 2006 and ended in 2007

[1] Incluye 49 viajes (26 por observadores del programa del CIAT y 23 por observadores de los programas nacionales) iniciados a fines de 2006 y completados en 2007

TABLE 9. Preliminary estimates of the mortalities of dolphins in 2006, population abundance, and relative mortality, by stock.
TABLA 9. Estimaciones preliminares de la mortalidad incidental de delfines en 2006, la abundancia de poblaciones, y la mortalidad relativa, por población.

Species and stock	Incidental mortality	Population abundance	Relative mortality (percent)
Especie y población	**Mortalidad incidental**	**Abundancia de la población**	**Mortalidad relativa (porcentaje)**
Offshore spotted dolphin—Delfín manchado de altamar[1]			
Northeastern—Nororiental	144	782,900	0.02
Western-southern—Occidental y sureño	135	892,600	0.02
Spinner dolphin—Delfín tornillo[1]			
Eastern—Oriental	155	592,200	0.03
Whitebelly—Panza blanca	157	617,100	0.03
Common dolphin—Delfín común[2]			
Northern—Norteño	130	449,462	0.03
Central	87	577,048	0,02
Southern—Sureño	38	1,525,207	<0.01
Other dolphins—Otros delfines[3,4]	40	2,802,300	<0.01
Total	886	8,238,817	0.01

[1] logistic model for 1986-2003 (IATTC Special Report 14: Appendix 7);
[1] modelo logístico para 1986-2003 (Informe Especial de la CIAT 14: Anexo 7)
[2] weighted averages for 1998-2003 (IATTC Special Report 14: Appendix 5)
[2] promedios ponderados para 1998-2003 (Informe Especial de la CIAT 14: Anexo 5)
[3] pooled for 1986-1990 (Report of the International Whaling Commission, 43: 477-493)
[3] agrupados para 1986-1990 (Informe de la Comisión Ballenera Internacional, 43: 477-493)
[4] "Other dolphins" includes the following species and stocks, whose observed mortalities were as follows: striped dolphins (*Stenella coeruleoalba*), 6; coastal spotted dolphin (*Stenella attenuata*), 3; Central American spinner dolphin (*Stenella longirostris centroamericana*), 6; bottlenose dolphin (*Tursiops truncatus*), 3; shortfin pilot whale (*Globicephala macrorhynchus*), 2; unidentified dolphins, 20.
[4] "Otros delfines" incluye las siguientes especies y poblaciones, con las mortalidades observadas correspondientes: delfín listado (*Stenella coeruleoalba*), 6; delfin manchado costero (*Stenella attenuata*), 3; delfin tornillo centroamericano (*Stenella longirostris centroamericana*), 6; tonina (*Tursiops truncatus*), 3; ballena piloto (*Globicephala macrorhynchus*), 2; delfines no identificados, 20.

TABLE 10. Annual estimates of dolphin mortality, by species and stock, 1979-2006. The data for 2005 are preliminary. The estimates for 1979-1992 are based on a mortality-per-set ratio. The sums of the estimated mortalities for the northeastern and western-southern stocks of offshore spotted dolphins do not necessarily equal those for the previous stocks of northern and southern offshore spotted dolphins because the estimates for the two stock groups are based on different areal strata, and the mortalities per set and the total numbers of sets vary spatially.

TABLA 10. Estimaciones anuales de la mortalidad de delfines, por especie y población, 1979-2006. Los datos de 2005 son preliminares. Las sumas de las mortalidades estimadas para las poblaciones nororiental y occidental y sureño del delfín manchado de altamar no equivalen necesariamente a las sumas de aquéllas para las antiguas poblaciones de delfín manchado de altamar norteño y sureño porque las estimaciones para los dos grupos de poblaciones se basan en estratos espaciales diferentes, y las mortalidades por lance y el número total de lances varían espacialmente.

Year	Offshore spotted[1]		Spinner		Common			Others	Total
	North-eastern	Western-southern	Eastern	White-belly	Northern	Central	Southern		
Año	Manchado de altamar[1]		Tornillo		Común			Otros	Total
	Nor-oriental	Occidental y sureño	Oriental	Panza blanca	Norteño	Central	Sureño		
1979	4,828	6,254	1,460	1,312	4,161	2,342	94	880	21,331
1980	6,468	11,200	1,108	8,132	1,060	963	188	633	29,752
1981	8,096	12,512	2,261	6,412	2,629	372	348	367	32,997
1982	9,254	9,869	2,606	3,716	989	487	28	1,347	28,296
1983	2,430	4,587	745	4,337	845	191	0	353	13,488
1984	7,836	10,018	6,033	7,132	0	7,403	6	156	38,584
1985	25,975	8,089	8,853	6,979	0	6,839	304	1,777	58,816
1986	52,035	20,074	19,526	11,042	13,289	10,884	134	5,185	132,169
1987	35,366	19,298	10,358	6,026	8,216	9,659	6,759	3,200	98,882
1988	26,625	13,916	18,793	3,545	4,829	7,128	4,219	2,074	81,129
1989	28,898	28,530	15,245	8,302	1,066	12,711	576	3,123	98,451
1990	22,616	12,578	5,378	6,952	704	4,053	272	1,321	53,874
1991	9,005	4,821	5,879	2,974	161	3,182	115	990	27,127
1992	4,657	1,874	2,794	2,044	1,773	1,815	64	518	15,539
1993	1,139	757	821	412	81	230	0	161	3,601
1994	935	1,226	743	619	101	151	0	321	4,096
1995	952	859	654	445	9	192	0	163	3,274
1996	818	545	450	447	77	51	30	129	2,547
1997	721	1,044	391	498	9	114	58	170	3,005
1998	298	341	422	249	261	172	33	101	1,877
1999	358	253	363	192	85	34	1	62	1,348
2000	295	435	275	262	54	223	10	82	1,636
2001	592	311	469	372	94	203	46	44	2,131
2002	442	204	405	186	69	155	4	50	1,515
2003	290	341	289	171	133	140	99	39	1,502
2004	260	256	224	214	156	100	222	37	1,469
2005	273	100	275	115	114	57	154	63	1,151
2006	147	135	155	157	130	87	38	37	886

[1] The estimates for offshore spotted dolphins include mortalities of coastal spotted dolphins.
[1] Las estimaciones de delfines manchados de altamar incluyen mortalidades de delfines manchados costeros.

TABLE 11. Standard errors of annual estimates of dolphin species and stock mortality for 1979-1994, and 2001-2003. There are no standard errors for 1995-2000, and 2004-2006, because the coverage was at or nearly at 100 percent during those years.

TABLA 11. Errores estándar de las estimaciones anuales de la mortalidad de delfines por especie y población para 1979-1994, y 2001-2003. No hay errores estándar para 1995-2000, y 2004-2006, porque la cobertura fue de 100%, o casi, en esos años.

Year	Offshore spotted		Spinner		Common			Other
	North-eastern	Western-southern	Eastern	Whitebelly	Northern	Central	Southern	
Añ0	Manchado de altamar		Tornillo		Común			Otros
	Nor-oriental	Occidental y sureño	Oriental	Panza blanca	Norteño	Central	Sureño	
1979	817	1,229	276	255	1,432	560	115	204
1980	962	2,430	187	3,239	438	567	140	217
1981	1,508	2,629	616	1,477	645	167	230	76
1982	1,529	1,146	692	831	495	168	16	512
1983	659	928	284	1,043	349	87	-	171
1984	1,493	2,614	2,421	3,773	-	5,093	3	72
1985	3,210	951	1,362	1,882	-	2,776	247	570
1986	8,134	2,187	3,404	2,454	5,107	3,062	111	1,722
1987	4,272	2,899	1,199	1,589	4,954	2,507	3,323	1,140
1988	2,744	1,741	1,749	668	1,020	1,224	1,354	399
1989	3,108	2,675	1,674	883	325	4,168	295	430
1990	2,575	1,015	949	640	192	1,223	95	405
1991	956	454	771	598	57	442	30	182
1992	321	288	168	297	329	157	8	95
1993	89	52	98	33	27	-	-	29
1994	69	55	84	41	35	8	-	20
2001	3	28	1	6	7	7	-	1
2002	1	2	1	1	1	1	1	1
2003	1	1	1	1	-	1	1	-

TABLE 12. Percentages of sets with no dolphin mortalities, with major gear malfunctions, with net collapses, with net canopies, average times of backdown (in minutes), and average number of live dolphins left in the net at the end of backdown.
TABLA 12. Porcentajes de lances sin mortalidad de delfines, con averías mayores, con colapso de la red, con abultamiento de la red, duración media del retroceso (en minutos), y número medio de delfines en la red después del retroceso.

Year	Sets with zero mortality (percent)	Sets with major malfunctions (percent)	Sets with net collapse (percent)	Sets with net canopy (percent)	Average duration of backdown (minutes)	Average number of live dolphins left in net after backdown
Año	**Lances sin mortalidad (porcentaje)**	**Lances con averías mayores (porcentaje)**	**Lances con colapso de la red (porcentaje)**	**Lances con abultamiento de la red (porcentaje)**	**Duración media del retroceso (minutos)**	**Número medio de delfines en la red después del retroceso**
1986	38.1	9.5	29.0	22.2	15.3	6.0
1987	46.1	10.9	32.9	18.9	14.6	4.4
1988	45.1	11.6	31.6	22.7	14.3	5.5
1989	44.9	10.3	29.7	18.3	15.1	5.0
1990	54.2	9.8	30.1	16.7	14.3	2.4
1991	61.9	10.6	25.2	13.2	14.2	1.6
1992	73.4	8.9	22.0	7.3	13.0	1.3
1993	84.3	9.4	12.9	5.7	13.2	0.7
1994	83.4	8.2	10.9	6.5	15.1	0.3
1995	85.0	7.7	10.3	6.0	14.0	0.4
1996	87.6	7.1	7.3	4.9	13.6	0.2
1997	87.7	6.6	6.1	4.6	14.3	0.2
1998	90.3	6.3	4.9	3.7	13.2	0.2
1999	91.0	6.6	5.9	4.6	14.0	0.1
2000	90.8	5.6	4.3	5.0	14.9	0.2
2001	91.6	6.5	3.9	4.6	15.6	0.1
2002	93.6	6.0	3.1	3.3	15.0	0.1
2003	93.9	5.2	3.5	3.7	14.5	<0.1
2004	93.8	5.4	3.4	3.4	15.2	<0.1
2005	94.9	5.0	2.6	2.7	14.5	<0.1
2006	93.9	5.7	3.3	3.5	15.8	<0.1

TABLE 13. Oceanographic and meteorological data for the Pacific Ocean, January-June 2007. The values in parentheses are anomalies. SST = sea-surface temperature; SOI = Southern Oscillation Index; SOI* and NOI* are defined in the text.
TABLA 13. Datos oceanográficos y meteorológicos del Océano Pacífico, enero-junio 2007. 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	**1**	**2**	**3**	**4**	**5**	**6**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	25.0 (0.5)	26.3 (0.2)	25.8 (-0.7)	24.4 (-1.1)	22.8 (-1.6)	21.7 (-1.4)
Area 2 (5°N-5°S, 90°-150°W	26.5 (0.9)	26.5 (0.1)	26.8 (-0.3)	27.1 (-0.3)	26.4 (-0.7)	25.9 (-0.5)
Area 3 (5°N-5°S, 120°-170°W)	27.3 (0.7)	26.8 (0.1)	27.1 (0.0)	27.8 (0.1)	27.6 (-0.2)	27.6 (0.1)
Area 4 (5°N-5°S, 150W°-160°E)	28.9 (0.8)	28.6 (0.6)	28.6 (0.5)	28.7 (0.3)	28.9 (0.2)	29.0 (0.4)
Thermocline depth—Profundidad de la termoclina, 0°, 80°W (m)	25	20	20	15	25	25
Thermocline depth—Profundidad de la termoclina, 0°, 110°W (m)	50	35	30	10	15	25
Thermocline depth—Profundidad de la termoclina, 0°, 150°W (m)	120	120	125	100	90	105
Thermocline depth—Profundidad de la termoclina, 0°, 180°W (m)	160	170	170	170	170	170
Sea level—Nivel del mar, Baltra, Ecuador (cm)	197.7 (17.0)	186.1 (3.9)	184.7 (2.9)	186.1 (3.4)	190.6 9.2	190.3 (9.4)
Sea level—Nivel del mar, Callao, Peru	117.0 (5.5)	109.1 (-4.8)	109.3 (-5.4)	102.8 (-11.7)	105.7 (-7.8)	99.7 (-12.3)
SOI—IOS	-1.1	-0.5	-0.4	-0.4	-0.4	0.2
SOI*—IOS*	0.36	0.92	2.85	1.24	5.50	2.69
NOI*—ION*	8.06	2.21	5.11	1.96	2.03	3.35