INTER-AMERICAN TROPICAL TUNA COMMMISSION
COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

QUARTERLY REPORT—INFORME TRIMESTRAL

April-June 2012—Abril-Junio 2012

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

El Informe Trimestral de la Comisión Interamericana del Atún Tropical es un relato informal 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.

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INTRODUCTION

The Inter-American Tropical Tuna Commission (IATTC) operated from 1950 to 2010 under the authority and direction of a Convention signed by representatives of the governments of Costa Rica and the United States of America on 31 May 1949. The Convention was open to the adherence by other governments whose nationals participated in the fisheries for tropical tunas and tuna-like species in the eastern Pacific Ocean (EPO). The original convention was replaced by the "Antigua Convention" on 27 August 2010, 15 months after it had been ratified or acceded to by seven Parties that were Parties to the original Convention on the date that the Antigua Convention was open for signature. On that date, Belize, Canada, China, Chinese Taipei, and the European Union became members of the Commission, and Spain ceased to be a member. Spanish interests were henceforth handled by the European Union. Kiribati joined the IATTC in June 2011. There were 21 members of the IATTC at the end of the second quarter of 2012.

The Antigua Convention states that the "Scientific Staff shall operate under the supervision of the Director," that it will "conduct scientific research … approved by the Commission," and "provide the Commission, through the Director, with scientific advice and recommendations in support of the formulation of conservation and management measures and other relevant matters." It states that "the objective of this Convention is to ensure the long-term conservation and sustainable use of the "tunas and tuna-like species and other species of fish taken by vessels fishing for tunas and tuna-like species," but it also states that the Commission is to "adopt, as necessary, conservation and management measures and recommendations for species belonging to the same ecosystem and that are affected by fishing for, or dependent on or associated with, the fish stocks covered by this Convention, with a view to maintaining or restoring populations of such species above levels at which their reproduction may become seriously threatened."

The scientific program is now in its 62nd 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.

MEETINGS

IATTC meetings

Dr. Guillermo A. Compeán participated in the First Workshop on Vessel Buybacks in Mexico City on 18-20 April 2012, at which he gave a presentation entitled "Vessel Buyback Program.".

The third meeting of the Scientific Advisory Committee was held on 15-18 May 2012. The following Background Papers were presented at that meeting:

SAC-03-03	The Fishery for Tunas and Billfishes in the Eastern Pacific Ocean in 2011
SAC-03-05	Status of Yellowfin Tuna in the Eastern Pacific Ocean in 2011 and Outlook for the Future, by Alexandre Aires-da-Silva and Mark N. Maunder
SAC-03-06	Status of Bigeye Tuna in the Eastern Pacific Ocean in 2011 and Outlook for the Future, by Alexandre Aires-da-Silva and Mark N. Maunder
SAC-03-06C	A Critical Evaluation of the Construction of the Kobe Strategy Matrix: Lessons Learned from Bigeye Tuna in the Eastern Pacific Ocean, by Mark N. Maunder, Alexandre Aires-da-Silva, and Richard Deriso
SAC-03-07a	Status of Skipjack Tuna in the Eastern Pacific Ocean in 2011, by Mark N. Maunder
SAC-03-07b	Updated Indicators of Stock Status for Skipjack Tuna in the Eastern Pacific Ocean, by Mark N. Maunder
SAC-03-07c	Preliminary Analysis of Historical and Recent Skipjack Tuna Tagging Data to Explore Information on Exploitation Rates, by Mark N. Maunder
SAC-03-09	Reference Points, Decision Rules, and Management Strategy Evaluation for Tunas and Associated Species in the Eastern Pacific Ocean, by Mark N. Maunder
SAC-03-10	Progress Report on the Development of Poststratified Estimators of Total Catch for the Purse-Seine Fishery Port-Sampling Data, by Cleridy E. Lennert-Cody, Mark N. Maunder, Patrick K. Tomlinson, Alexandre Aires-da-Silva, and Alejandro Pérez
SAC-03-11	Ecosystem Considerations
SAC-03-11b-iii	Protocol for the Use of Sorting Grids to Allow Small Tunas to Escape from Purse-Seine Nets, by Martín Hall
SAC-03-11d	Data Collection for Longline Fleets, by Martín Hall
SAC-03-12	Current and Planned Activities of the IATTC Staff
SAC-03-INF A	A Length-Structured Meta-Population Stock Assessment Model: Application to Skipjack Tuna in the Eastern Pacific Ocean, by Mark N. Maunder

The following IATTC meetings were held in La Jolla, California, USA, in June 2012:

Dates	Number	Meeting
18 June	30	Permanent Working Group on Tuna Tracking
18 June	17	Working Group to Promote and Publicize the AIDCP Dolphin Safe Tuna Certification System
18 June	51	International Review Panel
19 June	25	Parties [to the Agreement on the International Dolphin Conservation Program]
20-21 June	3	Committee for the Review of Implementation of Measures Adopted by the Commission
22 June	12	Working Group on Finance
23 June	13	Permanent Working Group on Fleet Capacity
25-29 June	83	Inter-American Tropical Tuna Commission

The following background documents were presented at the 83rd IATTC meeting:

Number	Document
IATTC 83-05	Tunas And Billfishes in the Eastern Pacific Ocean in 2011
IATTC 83-05c (revised)	Recommendations by the Staff for the Conservation of Tunas and Sharks in the Eastern Pacific Ocean, 2012-2013
IATTC 83-10	Technical Assistance for Developing Countries
IATTC 83-11	Program and Budget for Fiscal Years 2013 and 2014 (1 January-31 December 2013 and 2014)
IATTC 83-11b	Supplemental Information on the Budget
IATTC 83-12	Implementation of the IATTC Regional Observer Program for Transshipments at Sea
IATTC 83-12	Status of the IATTC Performance Review
IATTC 83-INF-A	IATTC Pension Fund
IATTC 83 INF-B	IATTC–WCPFC Overlap Area

Other meetings

Dr. Michael G. Hinton participated in a Billfish Working Group meeting of the International Scientific Committee to Study the Tuna and Tuna-like Species of the North Pacific Ocean held at Shanghai Ocean University, Shanghai, China, on 2-9 April 2012.

Dr. Mark N. Maunder submitted two papers to the Workshop on Assessment/Management Issues Related to Recruitment, sponsored by the Alaska Science Center, in Seattle, Washington, USA, on 4-5 April 2012. The papers were entitled:

"Comprehensive Analysis of the Stock-Recruitment Relationship and Reference Points" and

"A New Paradigm for Stock-Recruitment Relationships: Viewing the Stock-Recruitment Relationship as Density Dependent Survival Invalidates the Beverton-Holt and Ricker Models."

Dr. Maunder was not physically present at the workshop, but the two papers were made available electronically to the participants.

Dr. Mark N. Maunder participated in a Workshop on Application of Non-Linear Time Series Methods, sponsored by the U.S. National Marine Fisheries Service, in La Jolla, California, USA, on 17-19 April 2012. He gave a talk entitled "Stock Assessment Based on Locally Weighted Multiple Regression" at the workshop.

Dr. Alexandre Aires-da-Silva participated in the Reunión de Coordinación del Grupo de Trabajo Regional de Tiburones y Especies Altamente Migratorias in Tegulcigalpa, Honduras, on 25-27 April 2012, at which he gave a talk entitled "La CIAT y las Evaluaciones en Poblaciones de Tiburones en el Marco de la Convención de Antigua."

Many members of the IATTC staff participated in all or parts of the 63rd Tuna Conference at Lake Arrowhead, California, on 21-24 May 2012. Dr. William H. Bayliff and Messrs. Kurt M. Schaefer and Daniel W. Fuller served as moderators of sessions. Talks were given by Drs. Richard B. Deriso and Michael D. Scott and Messrs. David A. Bratten, Daniel W. Fuller, Kurt M. Schaefer, and Vernon P. Scholey, and Ms. Jeanne B. Wexler. In addition, talks on research in which Drs. Daniel Margulies and Robert J. Olson and Messrs. Fuller, Schaefer, and Scholey and Mss. Wexler and Maria S. Stein had participated were presented by other speakers.

Dr. Guillermo A. Compeán participated in TUNA 2012, the 12th INFOFISH World Tuna Trade Conference and Exhibition, held in Bangkok, Thailand, on 23-25 May 2012. He gave a presentation entitled "Multiannual Program for the Conservation of Tuna in the Eastern Pacific Ocean in 2011-2013" at that meeting.

Dr. Guillermo A. Compeán participated in an EU (European Union] Conference on Regional Fisheries Management Organisations in Brussels, Belgium, on 31 May 2012.

Mr. Nickolas W. Vogel participated in the "2nd Workshop on the Capacity Building of Developing States on the Improvements in Fisheries Data Management" in Seoul, Korea, on 12-14 June 2012. The workshop was organized to enhance awareness of the importance of fisheries data, especially for stock assessment and management. Representatives of Regional Fisheries Management Organizations gave presentations on data collection systems, quality control, potential data gaps, and difficulties encountered, and offered solutions to common challenges. Mr. Vogel's travel expenses were paid by the Ministry for Food, Agriculture, Forestry and Fisheries of Korea.

Dr. Mark N. Maunder participated in the Western Atlantic Bluefin Tuna Stock-Recruit Relationship Workshop, held in Washington, D.C., USA, on 19-21 June 2012, at which he gave a presentation entitled "Comprehensive Analysis of the Stock-Recruitment Relationship and Reference Points." The workshop was organized by the National Geographic Society and the Pew Environment Group, which paid his travel expenses.

RESEARCH

DATA COLLECTION AND DATABASE PROGRAM

There are two major fisheries for tunas in the eastern Pacific Ocean (EPO; the region east of 150ºW, south of 50ºN, and north of 50°S), the commercial surface fishery and the longline

fishery. The catches by the commercial surface fishery are taken almost entirely by purse-seine and pole-and-line vessels based in ports of Western Hemisphere nations. The longline catches are taken almost entirely by vessels registered and based in Far Eastern nations. The staff of the IATTC collects data on the catches by purse-seine and pole-and-line vessels and samples the catches of these vessels at unloading facilities in Las Playas and Manta, Ecuador; Manzanillo and Mazatlan, Mexico; Panama, Republic of Panama; and Cumaná, Venezuela, where it has field offices, and also, to a lesser extent, at other ports. The governments of the nations in which the catches of the longliners that fish in the EPO are registered compile the catch and size data for those vessels and make the data, in aggregated form, available to the IATTC staff. The rest of this section deals almost entirely with the surface fisheries.

Compilation of data on the amounts of catch, and on species and length composition of the catch for the surface fisheries is complicated. Observers accompany all trips of Class-6 purse seiners (vessels with fish-carrying capacities greater than 363 metric tons) that fish in the EPO, and the data that they collect include the locations and dates of each set, the type of each set (dolphin, floating object, or unassociated), the approximate total weights of each species caught in each set, and the wells in which the fish caught in each set are stored. Similar data are obtained from the logbooks of smaller purse seiners and of pole-and-line vessels, although these data may be less accurate or less precise than those collected by the observers. Then, when a vessel unloads its catch, the weight of the contents of each well is made available to the IATTC staff. These "reported catch statistics"—catch statistics obtained from every possible source, including observer records, fishing vessel logbooks, unloading records, and data compiled by governmental agencies—are compiled to provide an estimate of the total amount of tropical tunas (yellowfin, bigeye, and skipjack combined) caught annually by the surface fisheries. In addition, sample data on the species and length composition of the catch are also obtained when a vessel unloads. The methods for collection of these sample data are described in the IATTC Annual Report for 2000 and in IATTC Stock Assessment Reports 2, 4, 10, 11, 12, and 13. 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 in the same sampling area, during the same calendar month, and by the same type of gear (pole-and-line, or in the same type of set of a Class 1-5 or a Class-6 vessel). These data are then categorized by fishery (Figure 1).

The sample data on species and length composition of the catch are eventually combined with the reported catch statistics to make the "final" estimates of the catches by species and length- and weight-frequency distributions by species that appear in the IATTC's Stock Assessment Reports, Fishery Status Reports, and papers in outside journals, but this does not take place until two or more months after the end of the calendar year. (If additional information is acquired after the "final" estimates are calculated, that information is used to recalculate the estimates.) Most of the catch statistics that appear in the rest of this report are preliminary, as the calculations cannot be performed until after the end of the year.

IATTC personnel at stationed at its field offices collected 336 length-frequency samples from 244 wells and abstracted logbook information for 337 trips of commercial fishing vessels during the second quarter of 2012.

Reported fisheries statistics

Information reported herein is for the EPO, unless noted otherwise. Catch is reported in metric tons (t), vessel capacity in cubic meters (m^3), and effort in days of fishing. Estimates of fisheries statistics with varying degrees of accuracy and precision are available. The most accurate and precise are those made after all available information has been entered into the data base, processed, and verified. 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 after the return of a vessel from a fishing trip. Thus the estimates for the current week are the most preliminary, while those made a year later are much more accurate and precise.

Fleet statistics for the purse seine and pole-and-line fisheries

The lists of vessels authorized to fish for tunas in the EPO are given in the IATTC Regional Vessel Register. The estimated total carrying capacity of the purse-seine and pole-and-line vessels that have or are expected to fish in the EPO during 2012 is about 216,300 m^3 (Table 1). The average weekly at-sea capacity for the fleet, for the weeks ending 1 April through 1 July, was about 159,400 m^3 (range: 133,000 to 163,700 m^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, in metric tons, of tropical tunas in the EPO during the period of January-June in 2012, and comparative statistics for 2007-2011, were:

Species	2012	2007-2011			Weekly average, 2012
		Average	Minimum	Maximum	
Yellowfin	129,900	107,500	96,300	119,500	5,000
Skipjack	122,400	122,400	79,000	163,500	4,700
Bigeye	29,700	29,700	21,300	33,600	1,100

Summaries of the estimated retained catches, by species and by flag of vessel, are shown in Table 2.

Catch-per-unit-of-effort statistics for purse seine vessels

No adjustments in the catch-per-unit-of-effort data are included for factors, such as type of set or vessel operating costs and market prices, which might identify whether a vessel was directing its effort toward a specific species.

The measures of catch rate used in analyses 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 Class-6 vessels (vessels with fish-carrying capacities greater than about 425 m^3), and only data for these vessels are included in these measures of catch rate. There are now far fewer pole-and-line vessels than in previous years, so the data for these vessels are combined without regard to fish-carrying capacities.

The estimated nominal catches per day of fishing for yellowfin, skipjack, and bigeye in the EPO during the first quarter of 2012 and comparative statistics for 2007-2011 were:

Region	Species	Gear	2012	2007-2011		
				Average	Minimum	Maximum
N of 5° N	Yellowfin	PS	13.5	12.8	9.2	16.0
S of 5° N			3.6	3.4	2.8	4.3
N of 5° N	Skipjack	PS	1.0	1.2	0.3	2.2
S of 5° N			9.0	11.0	7.2	14.3
EPO	Bigeye	PS	2.3	1.8	1.3	3.1
EPO	Yellowfin	LP	0.6	0.4	0.0	1.6
EPO	Skipjack	LP	2.2	0.4	0.0	1.3

Catch statistics for the longline fishery

The catches of bigeye by longline gear in the EPO are reported by flag states whose annual catches have exceeded 500 t (C-09-01 Tuna-conservation 2009-2011.). Preliminary estimates of the catches reported for the first two quarters of 2012 are shown in Table 3.

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. 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.

Data for fish caught during the first quarter of 2007-2012 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 2012, and the second shows data for the combined strata for the first quarter of each year of the 2007-2012 period. Samples from 207 wells were taken during the first quarter of 2012.

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 207 wells sampled that contained fish caught during the first quarter of 2012, 145 contained yellowfin. The estimated size compositions of these fish are shown in Figure 2a. The majority of the yellowfin catch during the first quarter was taken by sets on dolphins in the Northern and Inshore areas, and on floating objects in the Southern and Inshore areas. Lesser amounts were taken in the Northern dolphin and Northern and Southern unassociated fisheries. Small amounts of yellowfin were taken in the Equatorial floating object area.

The estimated size compositions of the yellowfin caught by all fisheries combined during the first quarters of 2007-2012 are shown in Figure 2b. The average weight of yellowfin caught

during the first quarter of 2012 (13.1 kg) was greater than those of the previous2 years, but considerably less than that of 2009 (22.6 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 207 wells sampled that contained fish caught during the first quarter of 2012, 129 contained skipjack. The estimated size compositions of these fish are shown in Figure 3a. Large amounts of skipjack in the 40- to 50-cm range were caught in the Inshore and Southern floating-object fisheries, and in the Southern unassociated fishery.

The estimated size compositions of the skipjack caught by all fisheries combined during the first quarter of 2007-2012 are shown in Figure 3b. The average weight of skipjack caught during the first quarter of 2012 (2.2 kg) was greater than those of 2011, but less than those of 2009and 2010.

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 207 wells sampled that contained fish caught during the first quarter of 2012, 36 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 Equatorial and Southern areas, with lesser amounts taken in floating-object sets in the Northern and Inshore areas.

The estimated size compositions of the bigeye caught by all fisheries combined during the first quarter of 2007-2012 are shown in Figure 4b. The average weight of bigeye caught during the first quarter of 2012 (10.8 kg) was greater than those of any of the previous five years.

The estimated retained purse-seine catch of bigeye less than 60 cm in length during the first quarter of 2012 was 771 t, or about 7 percent of the estimated total retained purse-seine catch of bigeye during that period. The corresponding amounts for 2007-2011 ranged from 1,948 to 5,013 t, or 16 to 35 percent. These values may differ slightly from those given in previous Quarterly Reports due to changes in the estimation procedure.

BIOLOGY AND ECOSYSTEM PROGRAM

Early life history studies

Yellowfin broodstock

The yellowfin broodstock in Tank 1 (1,362,000 L) at the Achotines Laboratory spawned daily during the quarter. Spawning occurred between 1:40 p.m. and 11:50 p.m. The numbers of eggs collected after each spawning event ranged from about 23,000 to 681,000. The water temperatures in the tank during the quarter ranged from 23.5° to 29.2°C.

At the end of the quarter there were six 50- to 60-kg, two 35- to 36-kg, and six 9- to 14-kg yellowfin in Tank 1.

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.

Comparative studies of yellowfin and Pacific bluefin larvae

A joint Kinki University-IATTC-ARAP [Autoridad de los Recursos Acuáticos de Panamá] 5-year research project is being supported in Panama by the Japan International Cooperation Agency (JICA) (see Quarterly Report for January-March 2011). This project, which is being conducted through the Science and Technology Research Partnership for Sustainable Development (SATREPS) Program, involves comparative studies of the early life histories of Pacific bluefin and yellowfin tuna.

As part of the SATREPS project, seven Kinki University faculty members, graduate students, and post-doctoral researchers (headed by Dr. Yoshifumi Sawada) and six ARAP scientists and technicians joined scientists of the Early Life History Group of the IATTC and Achotines Laboratory staff members at the Achotines Laboratory during May and June to conduct joint experimental studies on yellowfin tuna.

As part of the joint SATREPS project, scientists of the IATTC's Early Life History Group conducted several experiments with yellowfin larvae during late April, May, and early June. The first experiment investigated the survival and growth of yellowfin larvae reared in blue-interior the standard for Achotines Laboratory) versus green-interior (the standard for Kinki University) tanks. The results indicated no statistical differences in either survival or growth of yellowfin larvae reared in the two colors of tanks. Since green-interior tanks were recently purchased for the Achotines Laboratory and are also available at the Kinki laboratories in Japan, it was decided to use the green-interior tanks as the standard experimental tanks in all future SATREPS experimental studies.

Additional experiments were conducted with yellowfin larvae during May and June. Trials examining the effects of low and high concentrations of prey on growth of yellowfin larvae were completed. These trials are part of an ongoing comparative study of the growth potential of yellowfin versus Pacific bluefin larvae. In addition, an experiment was completed to determine the occurrence of density-dependent growth in yellowfin larvae. Identical growth studies will be conducted with Pacific bluefin larvae in Japan during July.

The second annual meeting of the SATREPS Joint Coordinating Committee (JCC) was held at the Achotines Laboratory on June 8, 2012. Representatives of ARAP, Kinki University, JICA, and the IATTC participated in the meeting. Observers from the Ministerio de Economía y Finanzas of Panama and the Japan Science and Technology Agency were also present. The SATREPS joint research plan and budgets for 2012 and 2013 were discussed during the meeting.

As reported in previous quarterly reports in 2010 and 2011, eggs and/or larvae of yellowfin tuna were successfully shipped from the Achotines Laboratory to the Hubbs Sea World Research Institute (HSWRI) in San Diego, California, USA, as part of a study funded by the Saltonstall-Kennedy Program, U.S. National Oceanic and Atmospheric Administration. The final shipment funded by this project was carried out in March, 2012. The success of this project was instrumental in the IATTC and HSWRI obtaining a California Sea Grant project entitled, "Development of Sustainable Tuna Aquaculture in the United States Using Yellowfin Tuna as a Model," which was approved in late 2011 and which will be carried out from 2012 to 2014. Mr. Kevin Stuart of the HSWRI spent the period of May 2-17, 2012, at the Achotines Laboratory. During his stay he worked with Achotines Laboratory staff members initiating the research outlined for this project, and the first of six planned shipments of yellowfin larvae from the Achotines Laboratory to the HSWRI was carried out on May 8, 2012. The shipment arrived in less than 24 hours and the initial survival of the larvae was good.

Studies of snappers

The work on snappers (*Lutjanus* spp.) is carried out by the Autoridad de los Recursos Acuáticos de Panamá (ARAP).

During 1996-2009, the ARAP staff had conducted full life cycle research on spotted rose snappers (*Lutjanus guttatus*) in captivity. Efforts to rebuild the broodstock population of this species to continue research has been unsuccessful in recent years, with three fish remaining in the broodstock snapper tank at the end of this quarter. ARAP plans to continue work with this species when they are able to establish a broodstock population.

Visitors at the Achotines Laboratory

Drs. Martin Grosell and Daniel Benetti and Messrs. John Steiglitz, Ed Mager, and Andrew Esbaugh of the University of Miami, Rosenstiel School of Marine and Atmospheric Science (RSMAS) carried out short-term rearing trials of yellowfin eggs and larvae from April 18 (when they arrived at the Achotines Laboratory) through May 10. During this research activity, they were joined at times by scientists from the NOAA Northwest Fisheries Science Center and Stanford University.

Oceanography and meteorology

Easterly surface winds blow almost constantly over northern South America, which cause upwelling of cool, nutrient-rich subsurface water along the equator east of 160ºW, in the coastal regions off South America, and in offshore areas off Mexico and Central America. El Niño events are characterized by weaker-than-normal easterly surface winds, which cause above-normal sea-surface temperatures (SSTs) and sea levels and deeper-than-normal thermoclines over much of the tropical eastern Pacific Ocean (EPO). In addition, the Southern Oscillation Indices (SOIs) are negative during El Niño episodes. (The SOI is the difference between the anomalies of sea-level atmospheric pressure at Tahiti, French Polynesia, and Darwin, Australia. It is a measure of the strength of the easterly surface winds, especially in the tropical Pacific in the Southern Hemisphere.) Anti-El Niño events, which are the opposite of El Niño events, are characterized by stronger-than-normal easterly surface winds, below-normal SSTs and sea levels,

shallower-than-normal thermoclines, and positive SOIs. Two additional indices, the NOI* (Progress Ocean., 53 (2-4): 115-139) and the SOI*, have recently been devised. The NOI* is the difference between the anomalies of sea-level atmospheric pressure at the North Pacific High (35°N-130°W) and Darwin, Australia, and the SOI* is the difference between the anomalies of sea-level atmospheric pressure at the South Pacific High (30°S-95°W) and Darwin. Ordinarily, the NOI* and SOI* values are both negative during El Niño events and positive during anti-El Niño events.

There was a sizeable area of cool water in the eastern and central Pacific Ocean during the fourth quarter of 2010, which reached a maximum in December of that year (IATTC Quarterly Report for October-December 2010: Figure 6). This was followed by a warming trend during the first two quarters of 2011, and the SST anomalies in Area 1 were above average during April, May, and June of that year (Table 4). The thermoclines along the equator were somewhat deeper during January-June 2011 than they had been during July-December 2010, indicating the weakening and subsequent disappearance of the anti-El Niño conditions of late 2010 and early 2011. During the third quarter of 2011, however, the warming trend came to an end, as small areas of cool water appeared in July and August, and then more cool water appeared in September, especially off southern Peru and northern Chile (IATTC Quarterly Report for July-September 2011: Figure 5). The cooling trend continued during the fourth quarter of 2011, and by December there was a band of cool water along the equator from the coast of South America to west of 180° (IATTC Quarterly Report for October-December 2011: Figure 6). The situation in 2011-2012 appears to be somewhat similar to that for 2010-2011—cooling during the fourth quarter, reaching a maximum in December, followed by warming during the first and second quarters. However, the cooling during the fourth quarter was more extensive during 2010 (IATTC Quarterly Report for October-December 2010: Figure 6) than during 2011 (IATTC Quarterly Report for October-December 2011: Figure 6). There was a large irregular area of cool water offshore between about 10°N and 25°N and a large irregular area of warm water adjacent to the coasts of Ecuador, Peru, and northern Chile in June 2012 (Figure 5)—quite different from the pattern of June of any other year of the 1999-2012 period. According to the Climate Diagnostics Bulletin of the U.S. National Weather Service for June 2012, "The forecaster consensus reflects increased chances for El Niño beginning in July-September 2012."

BYCATCH PROGRAM AND INTERNATIONAL DOLPHIN CONSERVATION PROGRAM

Data collection

The IATTC had field offices at Las Playas and Manta, Ecuador; Manzanillo and Mazatlan, Mexico; Panama, Republic of Panama; and Cumaná, Venezuela, during the second quarter of 2012. Members of the field office staffs placed IATTC observers on 121 fishing trips by vessels that participate in the AIDCP On-Board Observer Program and that fished in the eastern Pacific Ocean (EPO) during the quarter.

Observer program

Coverage

The Agreement on the International Dolphin Conservation Program (AIDCP) requires 100-percent coverage by observers on trips by Class-6 purse seiners (vessels with fish-carrying

capacities greater than 363 metric tons) that fish for tunas in the 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 2012 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 209 fishing trips aboard purse seiners covered by that program during the second quarter of 2012. Preliminary coverage data for these vessels during the quarter are shown in Table 5.

Training

There were no IATTC observer training courses conducted during the second quarter of 2012.

GEAR PROJECT

IATTC staff members did not participate in any dolphin safety-gear inspections or safety-panel alignment procedures aboard purse seiners during the second quarter of 2012.

PUBLICATIONS

Allain, Valerie, Simon Nicol, Jeffrey Polovina, Marta Coll, Robert Olson, Shane Griffiths, Jeffrey Dambacher, Jock Young, Jesus Jurado-Molina, Simon Hoyle, and Tim Lawson. 2012. International workshop on opportunities for ecosystem approaches to fisheries management in the Pacific Ocean tuna fisheries. Reviews in Fish Biology and Fisheries, 22 (1): 29-33.

Hall, Martín, Yonat Swimmer, and Mariluz Parga. 2012. No “silver bullets” but plenty of options: working with artisanal fishers in the eastern Pacific to reduce incidental sea turtle mortality in longline fisheries. *In* Seminoff, Jeffrey A., and Bryant P. Wallace (editors), Sea Turtles of the Eastern Pacific: Advances in Research and Conservation. The University of Arizona Press: 136-153.

Scholey, V., D. Bromhead, D. Margulies, S. Nicol, J. Wexler, M. Santiago, J.E. Williamson, S. Hoyle, P. Schlegel, J. Havenhand, T. Ilyina, and P. Lehodey. 2012. Novel research into the impacts of ocean acidification upon tropical tuna. PFRP [newsletter of the Pelagic Fisheries Program, University of Hawaii at Manoa] 16 (1): 1-8.

ADMINISRATION

Ms. Leanne Duffy returned to work on 16 May 2012, after 5 months of maternity leave. Everyone is pleased to have her back.

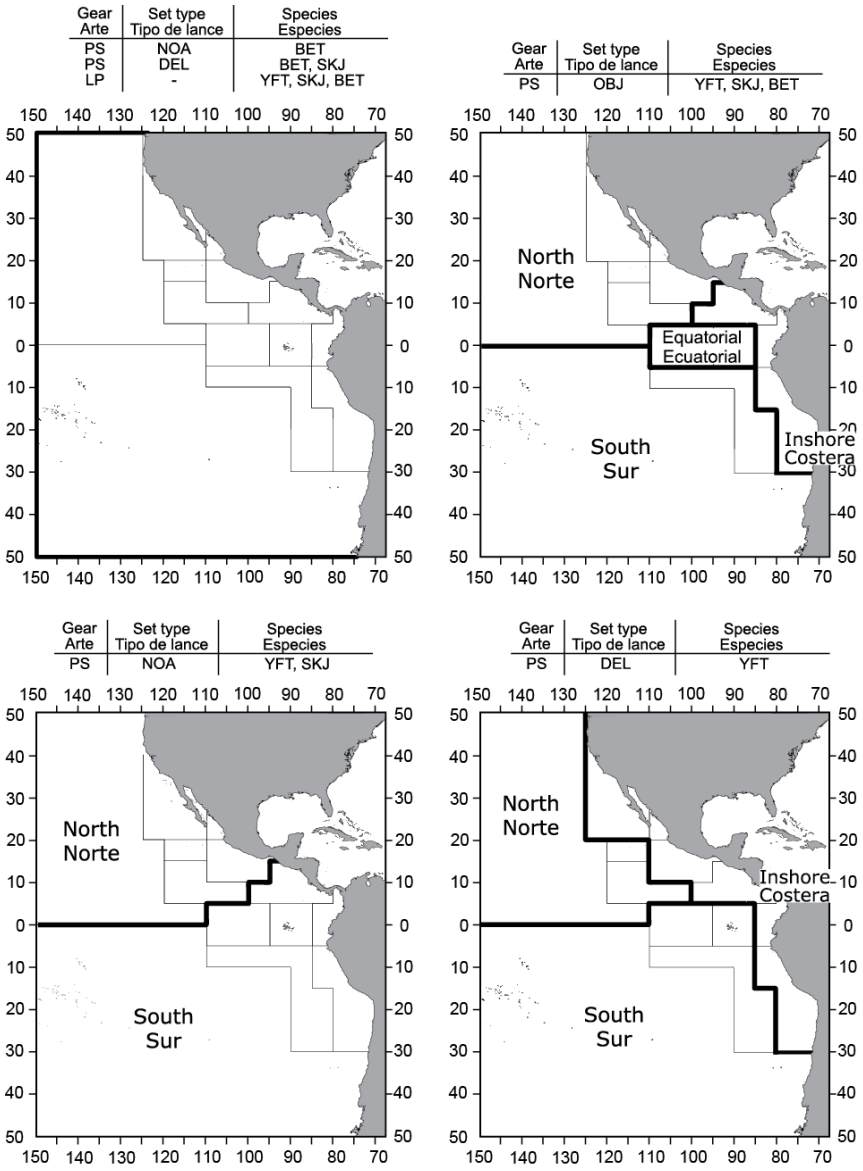

FIGURE 1. Spatial extents of the fisheries defined by the IATTC staff for stock assessment of yellowfin, skipjack, and bigeye in the EPO. The thin lines indicate the boundaries of the 13 length-frequency sampling areas, and the bold lines the boundaries of the fisheries. Gear: PS = purse seine, LP = 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, y patudo en el OPO. Las líneas delgadas indican los límites de las 13 zonas de muestreo de frecuencia de tallas, y las líneas gruesas los límites de las pesquerías. Artes: PS = red de cerco, LP = caña; Tipo de lance: NOA = peces no asociados, DEL = delfín; OBJ = objeto flotante; Especies: YFT = aleta amarilla, SKJ = barrilete, BET = patudo.

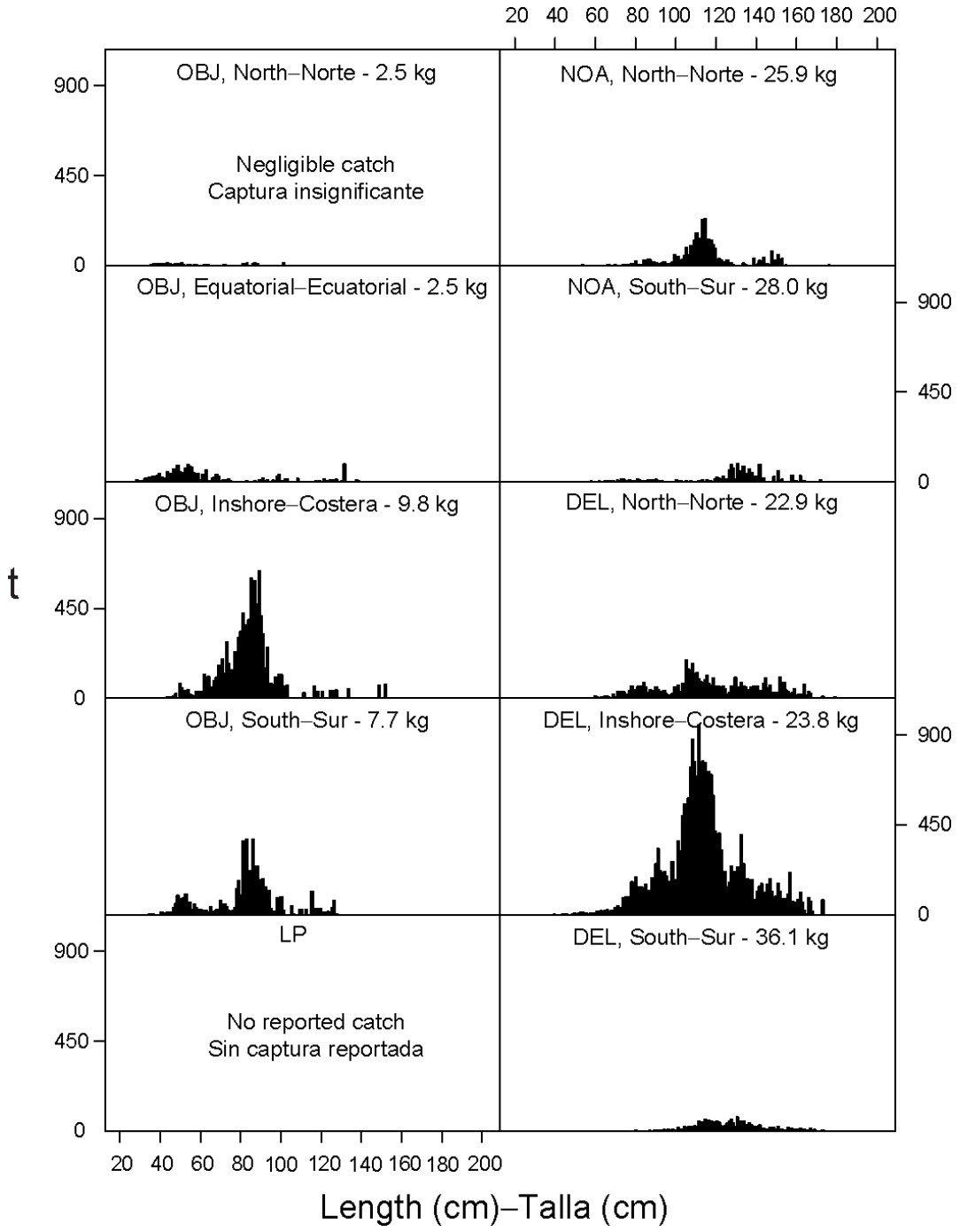

FIGURE 2a. Estimated size compositions of the yellowfin caught in each fishery of the EPO during the first quarter of 2012. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 2a. Composición por tallas estimada para el aleta amarilla capturado en cada pesquería del OPO durante el primer trimestre de 2012. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caña; NOA = peces no asociados; DEL = delfín; t = toneladas métricas.

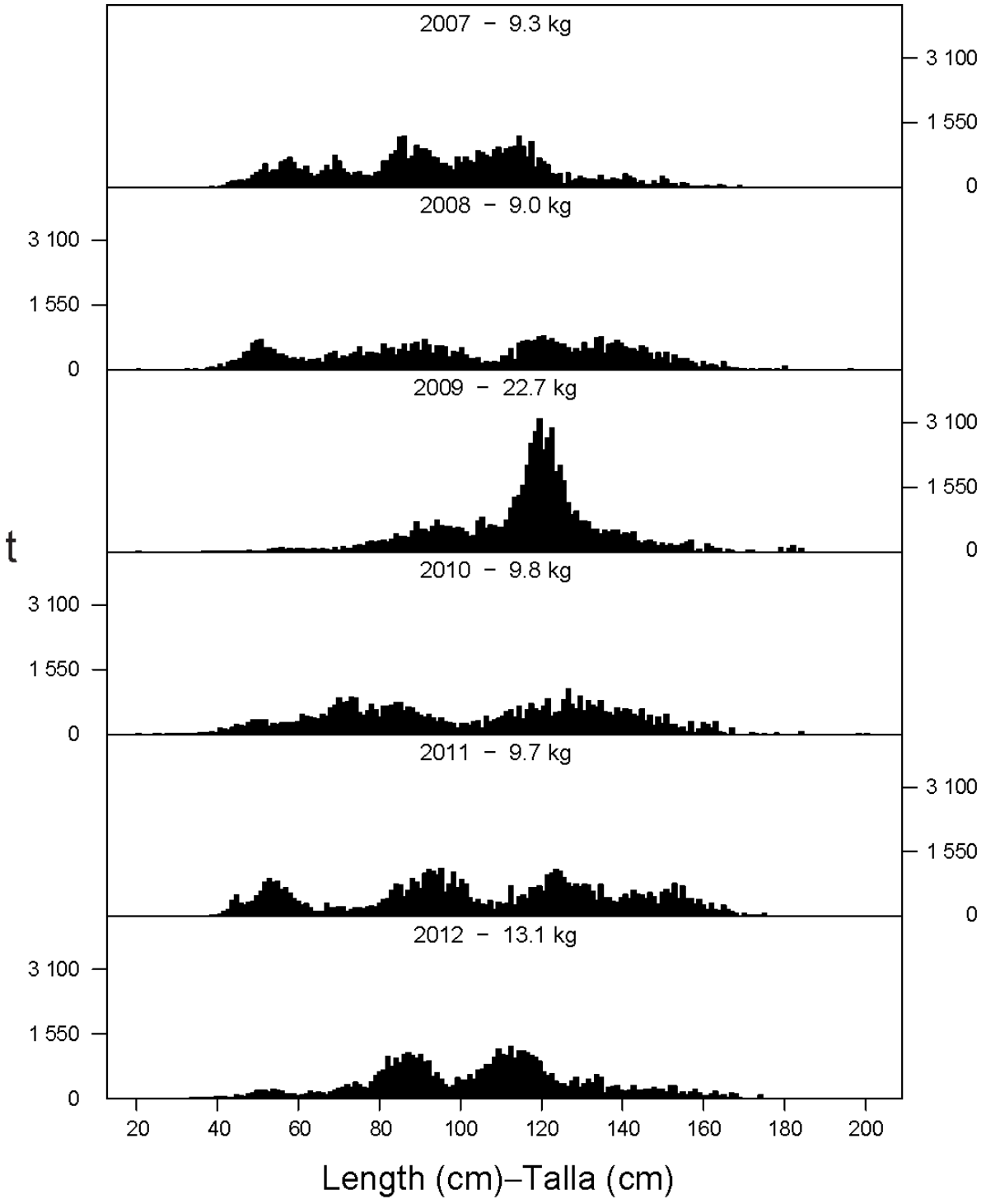

FIGURE 2b. Estimated size compositions of yellowfin tuna caught in the EPO during the first quarter of 2007-2012. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 2b. Composición por tallas estimada para el aleta amarilla capturado en el OPO en el primer trimestre de 2007-2012. En cada recuadro se detalla el peso promedio de los peces en las muestras; t = toneladas métricas.

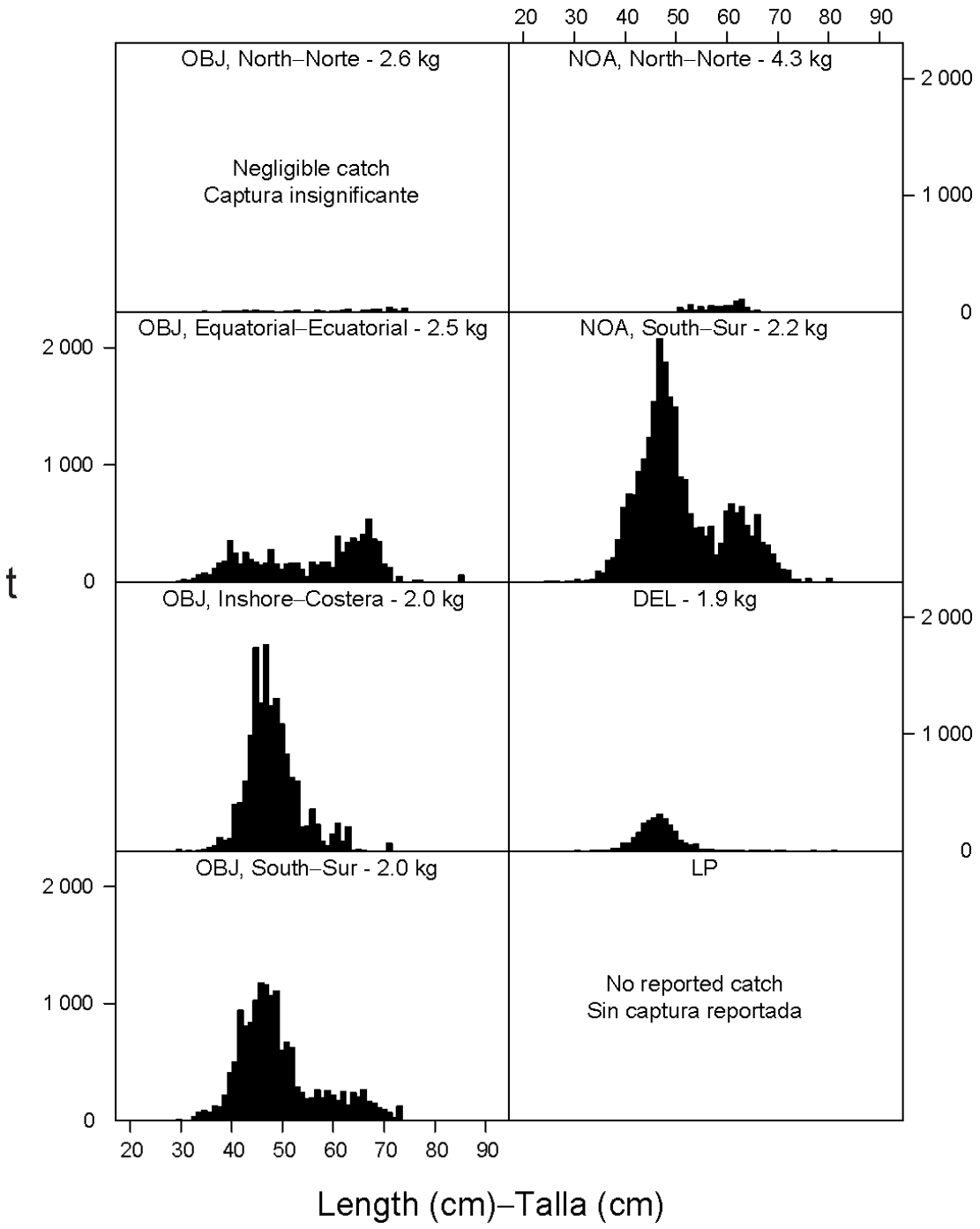

FIGURE 3a. Estimated size compositions of the skipjack caught in each fishery of the EPO during the first quarter of 2012. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 3a. Composición por tallas estimada para el barrilete capturado en cada pesquería del OPO durante el primer trimestre de 2012. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caña; NOA = peces no asociados; DEL = delfín; t = toneladas métricas.

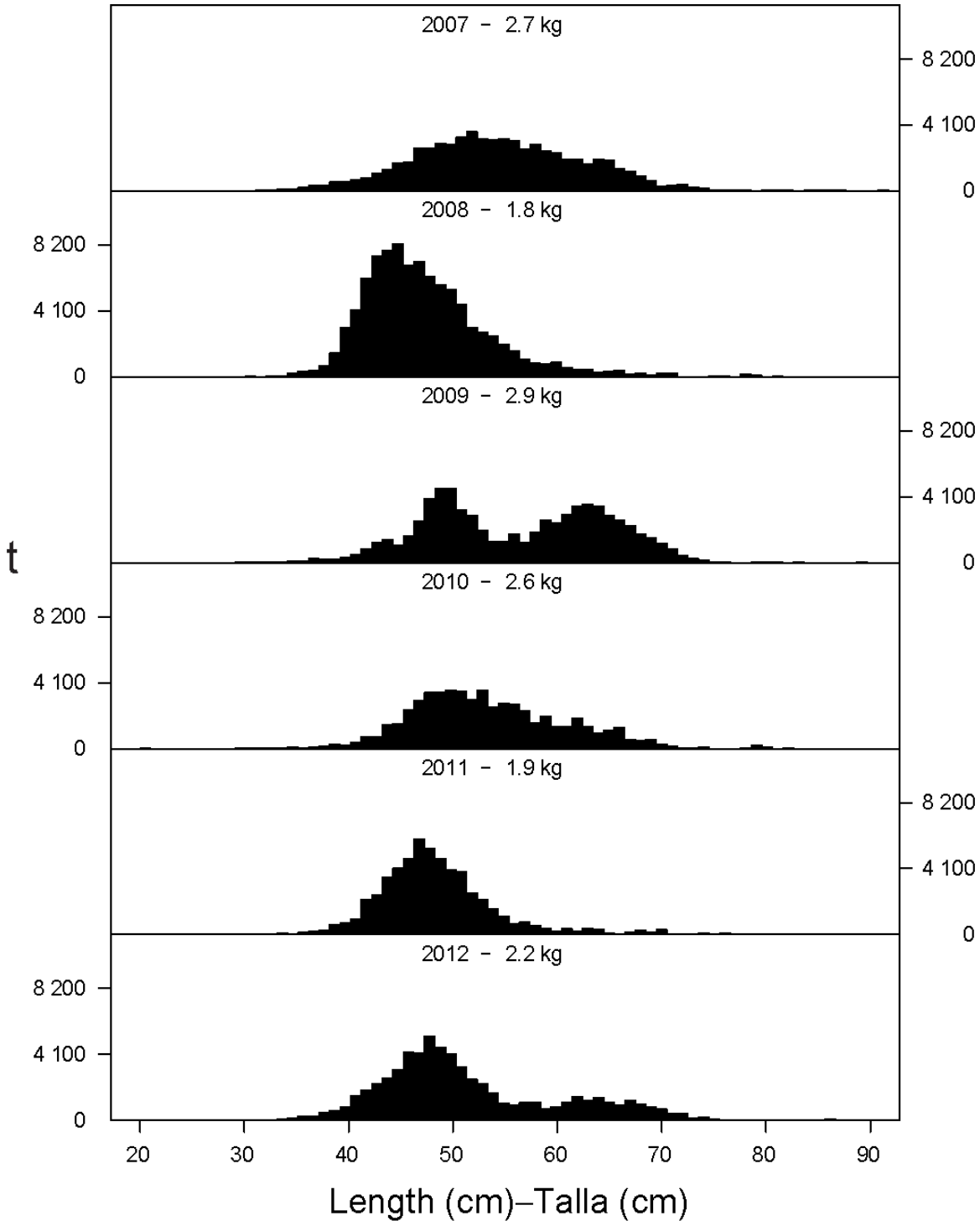

FIGURE 3b. Estimated size compositions of the skipjack caught in the EPO during the first quarter of 2007-2012. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 3b. Composición por tallas estimada para el barrilete capturado en el OPO en el primer trimestre de 2007-2012. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas.

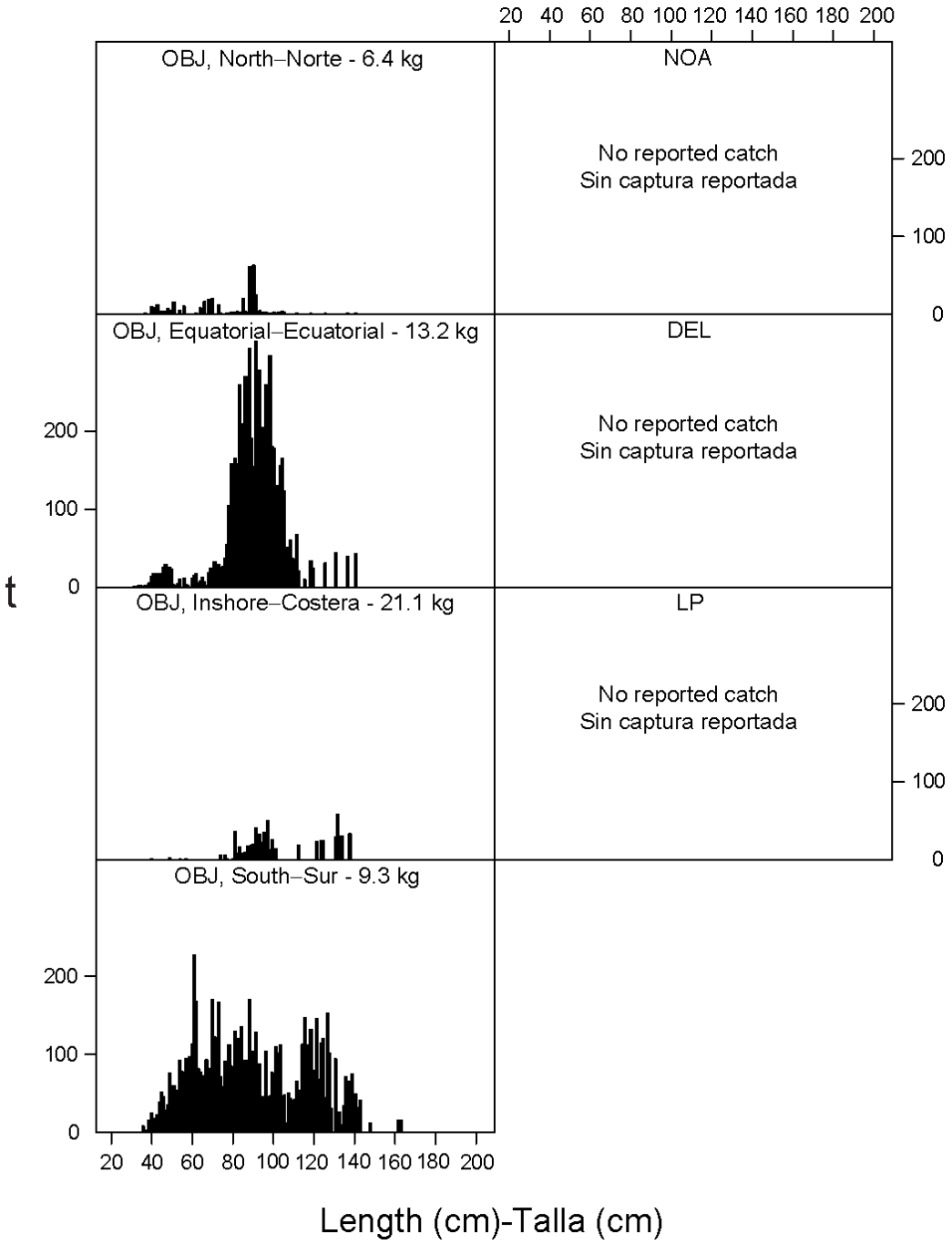

FIGURE 4a. Estimated size compositions of the bigeye caught in each fishery of the EPO during the first quarter of 2012. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 4a. Composición por tallas estimada para el patudo capturado en cada pesquería del OPO durante el primer trimestre de 2012. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caña; NOA = peces no asociados; DEL = delfín; t = toneladas métricas.

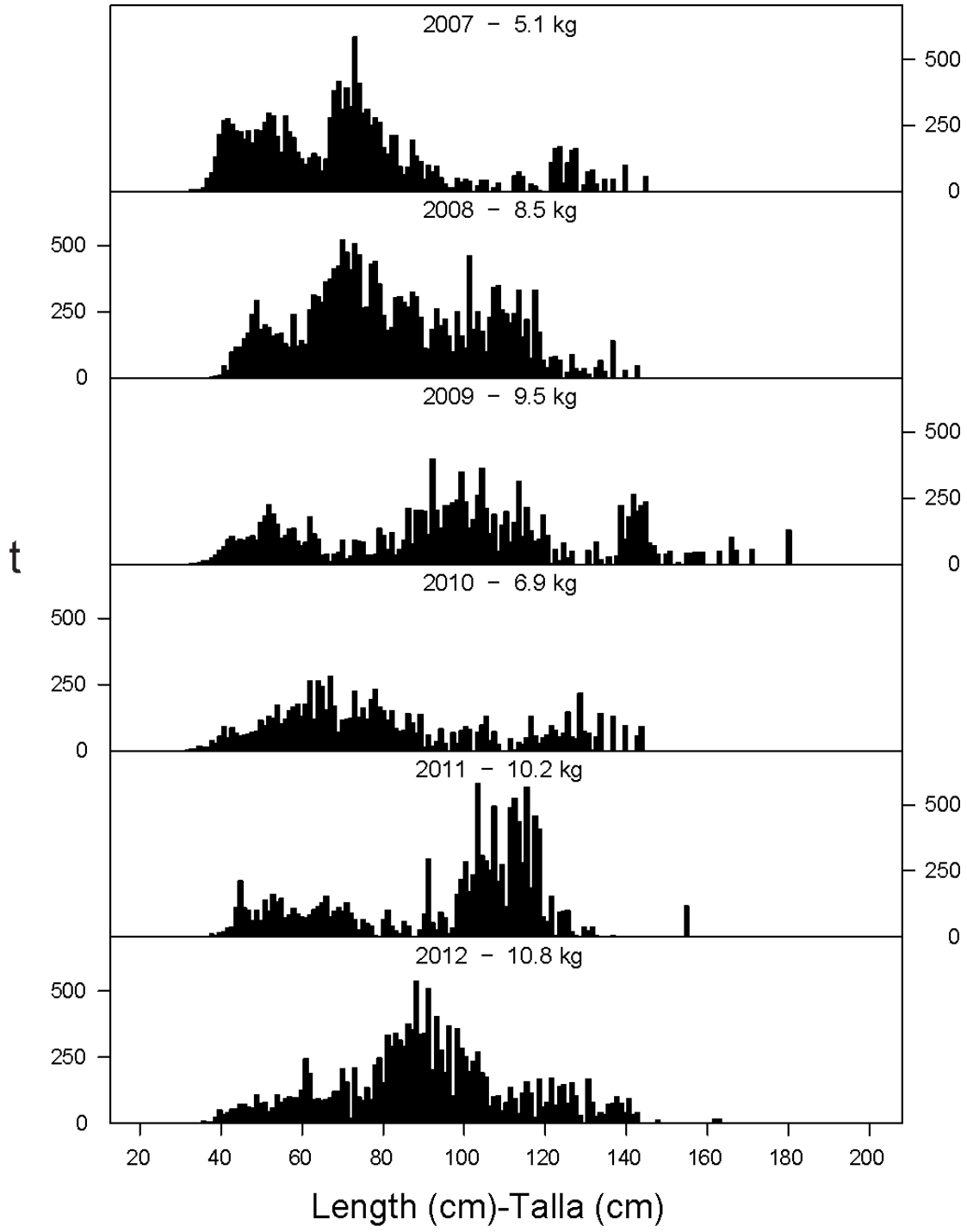

FIGURE 4b. Estimated size compositions of the bigeye caught in the EPO during the first quarter of 2007-2012. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 4b. Composición por tallas estimada para el patudo capturado en el OPO en el primer trimestre de 2007-2012. En cada recuadro se detalla el peso promedio de los peces en las muestras; t = toneladas métricas.

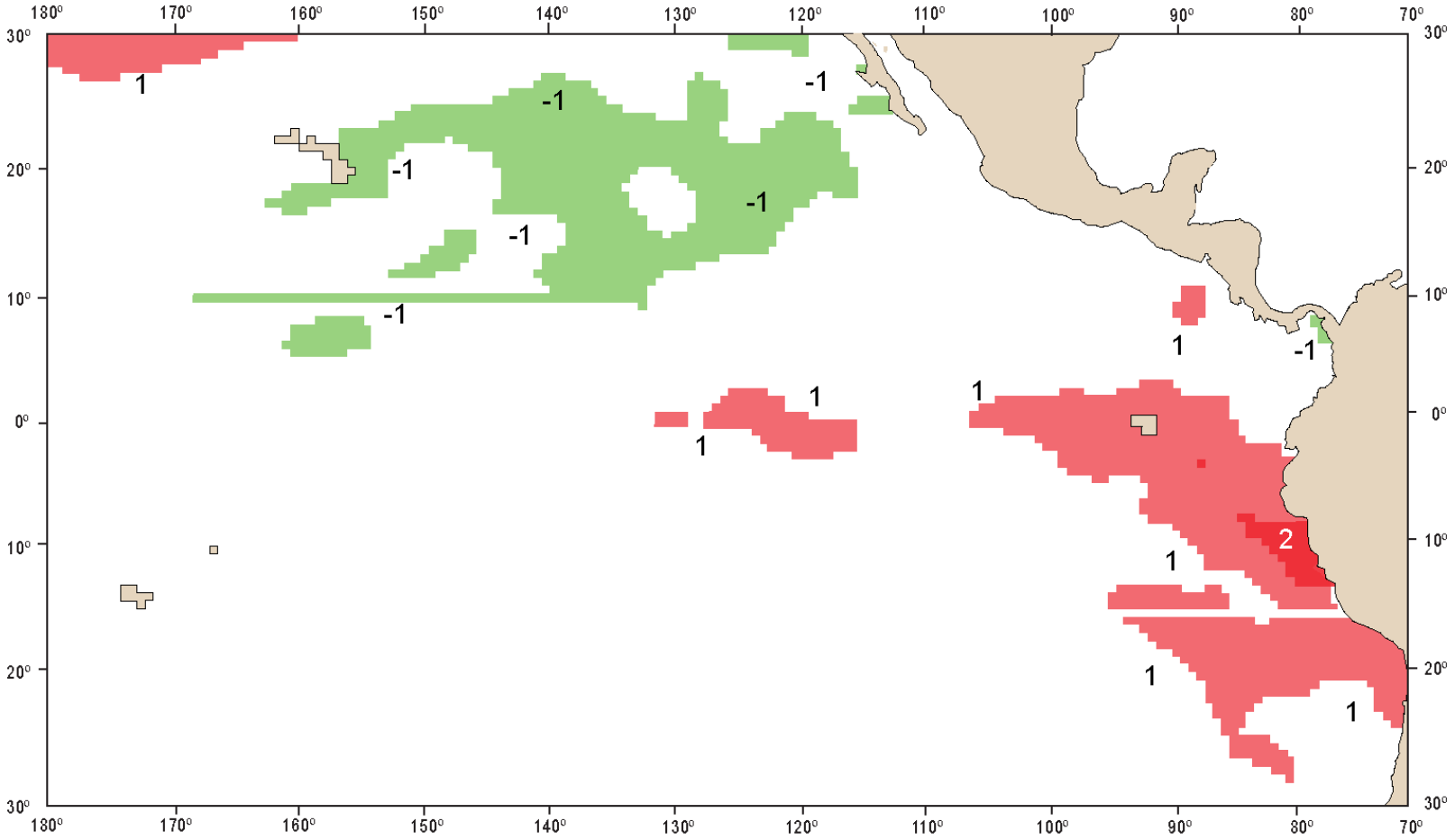

FIGURE 5. Sea-surface temperature (SST) anomalies (departures from long-term normals) for June 2012, based on data from fishing boats and other types of commercial vessels.
FIGURA 5. Anomalías (variaciones de los niveles normales a largo plazo) de la temperatura superficial del mar (TSM) en junio de 2012, basadas en datos tomados por barcos pesqueros y otros buques comerciales.

TABLE 1. Estimates of the numbers and capacities (m^3) of purse seiners and pole-and-line vessels operating in the EPO in 2012 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 del número de buques cerqueros y cañeros que pescan en el OPO en 2011, y de la capacidad de acarreo (m^3) de los mismos 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			
Colombia	PS	4	10	-	14	14,860
Ecuador	PS	72	19	10	101	76,610
Unión Europea (España)—European Union (Spain)	PS	-	-	4	4	10,116
Guatemala	PS	-	1	1	2	3,575
México	PS	10	31	1	42	48,054
	LP	2	-	-	2	143
Nicaragua	PS	-	5	1	6	8,478
Panamá	PS	2	10	3	15	20,451
El Salvador	PS	-	1	3	4	7,892
USA—EE.UU.	PS	-	2	-	2	2,855
Venezuela	PS	-	17	-	17	22,862
Vanuatu	PS	-	1	-	1	1,360
All flags—Todas banderas	PS	88	96	23	207	
	LP	2	-	-	2	
	PS + LP	90	96	23	209	
			Capacity—Capacidad			
All flags—Todas banderas	PS	41,482	124,780	49,855	216,117	
	LP	143	-	-	143	
	PS + LP	41,625	124,780	49,855	216,260	

TABLE 2. Estimates of the retained catches of tunas in the EPO, from 1 January through 1 July 2012, by species and vessel flag, in metric tons.
TABLA 2. Estimaciones preliminares de las capturas retenidas de atunes en el OPO del 1 de enero al 1 de julio 2012, 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 Pacífi-co**	**Bonitos (*Sarda* spp.)**	**Albacora**	**Barrilete negro**	**Otras[1]**	**Total**	**Porcentaje del total**
Colombia	14,125	8,323	831	-	-	-	-	-	23,279	8.0
Ecuador	17,289	74,538	22,139	-	3,262	-	27	44	117,299	40.6
México	61,074	4,534	197	1,304	-	-	2,294	-	69,403	24.0
Panamá	12,552	13,521	2,494	-	25	-	3	38	28,633	9.9
Venezuela	14,875	13,130	263	-	-	-	8	4	28,280	9.8
Other—Otros[2]	9,993	8,398	3,813	-	-	-	-	-	22,204	7.7
Total	129,908	122,444	29,737	1,304	3,287	-	2,332	86	289,098	

[1] Includes other tunas, sharks, and miscellaneous fishes
[1] Incluye otros túnidos, tiburones, y peces diversos
[2] Includes El Salvador, European Union (Spain), Guatemala, Nicaragua, United States, and Vanuatu; this category is used to avoid revealing the operations of individual vessels or companies.
[2] Incluye El Salvador, Estados Unidos, Guatemala, Nicaragua, Unión Europea (España), y Vanuatú; se usa esta categoría para no revelar información sobre faenas de buques o empresas individuales.

TABLE 3. Preliminary estimates of the catches of bigeye tuna, in metric tons, in the eastern Pacific Ocean during the first and second quarters of 2012 by longline vessels more than 24 meters in overall length.

TABLA 3. Estimaciones preliminares de las capturas de atún patudo, en toneladas métricas, en el Océano Pacífico oriental durante el primero y segundo trimestres de 2012 por buques palangreros de más de 24 metros en eslora total.

Flag	First quarter	Month			Second quarter	Total to date
Bandera	**Primer trimestre**	**Mes**			**Segundo trimestre**	**Total al fecha**
		4	**5**	**6**		
China	1,621	372	-	-	372	1,993
Republic of Korea—República de Corea*	1,557	241	110	147	498	2,055
Japan—Japón	3,584	769	-	-	769	4,353
Chinese Taipei—Taipei Chino	862	300	-	-	300	1,162
USA—EE.UU.	-	-	-	-	-	-
Vanuatu	195	17	12	-	29	224
Total	7,819	1,699	122	147	1,968	9,787

* Round weight obtained by adjustment applied to processed weight—Peso entero obtenido mediante ajuste aplicado al peso procesado provisto

TABLE 4. Oceanographic and meteorological data for the Pacific Ocean, July 2011-June 2012. The values in parentheses are anomalies. SST = sea-surface temperature; SOI = Southern Oscillation Index; SOI* and NOI* are defined in the text.
TABLA 4. Datos oceanográficos y meteorológicos del Océano Pacífico, julio 2011-june 2012. 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	**7**	**8**	**9**	**10**	**11**	**12**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	22.1 (0.5)	20.6 (0.0)	19.7 (-0.6)	20.2 (-0.6)	20.8 (-0.8)	21.8 (-1.1)
Area 2 (5°N-5°S, 90°-150°W	25.7 (0.1)	24.6 (-0.4)	24.2 (-0.6)	24.0 (-1.0)	23.9 (-1.1)	24.2 (-1.0)
Area 3 (5°N-5°S, 120°-170°W)	27.0 (-0.2)	26.2 (-0.6)	26.0 (-0.7)	25.7 (-1.0)	25.6 (-1.1)	25.5 (-1.0)
Area 4 (5°N-5°S, 150W°-160°E)	28.5 (-0.30	28.3 (-0.4)	28.1 (-0.6)	27.9 (-0.7)	27.9 (-0.8)	27.4 (-1.1)
Thermocline depth—Profundidad de la termoclina, 0°, 80°W	35	35	35	35	30	30
Thermocline depth—Profundidad de la termoclina, 0°,	55	55	35	30	25	60
Thermocline depth—Profundidad de la termoclina, 0°,	120	110	115	110	140	145
Thermocline depth—Profundidad de la termoclina, 0°, 180°W (m)	175	165	165	180	180	180
SOI—IOS	1.0	0.4	1.0	0.8	1.1	2.5
SOI*—IOS*	3.77	-0.11	0.14	3.17	0.20	3.74
NOI*—ION*	-0.39	0,47	0.29	1.41	1.72	7.89

Month—Mes	**1**	**2**	**3**	**4**	**5**	**6**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	23.7 (-0.8)	26.3 (0.2)	26.9 (0.3)	26.9 (1.3)	25.5 (1.2)	24.5 (1.6
Area 2 (5°N-5°S, 90°-150°W	24.8 (-0.8)	26.2 (-0.2)	26.9 (-0,2)	27.6 (0.1)	27.2 (0.2)	27.1 (0.7)
Area 3 (5°N-5°S, 120°-170°W)	25.5 (-1.1)	26.0 (-0.7)	26.6 (-0.6)	27.4 (-0.4)	27.8 (-0.1)	28.0 (0.3)
Area 4 (5°N-5°S, 150W°-160°E)	27.1 (-1.2)	27.2 (-0.9)	27.5 (-0.7)	28.2 (-0.3)	28.5 (-0.3)	28.7 (-0.1)
Thermocline depth—Profundidad de la termoclina, 0°, 80°W	15	15	10	10	15	35
Thermocline depth—Profundidad de la termoclina, 0°,	50	45	60	40	90	80
Thermocline depth—Profundidad de la termoclina, 0°,	150	120	110	130	130	125
Thermocline depth—Profundidad de la termoclina, 0°, 180°W (m)	180	190	180	195	180	190
SOI—IOS	-1.1	0.5	0.7	-0.3	0.0	-0.4
SOI*—IOS*	-0.28	-1.61	0.80	2.98	-3.19	-1.36
NOI*—ION*	4.86	3.72	0.16	-1.34	2.67	0.17

TABLE 5. Preliminary data on the sampling coverage of trips by Class-6 vessels (vessels with fish-carrying capacities greater than 363 metric tons) that fished in the EPO and departed during the second quarter of 2012, by the IATTC observer program and the national programs of Colombia, Ecuador, the European Union, Mexico, Nicaragua, Panama, and Venezuela. The numbers in parentheses indicate cumulative totals for the year.

TABLA 5. Datos preliminares de la cobertura de muestreo de viajes de buque de Clase 6 (buques con capacidad de acarreo mayor a 363 toneladas métricas) que pescaron en el OPO y salieron durante el segundo trimestre de 2012, por el programa de observadores de la CIAT y los programas nacionales de Colombia, Ecuador, México, Nicaragua, Panamá, la Unión Europea, y Venezuela. Los números entre paréntesis indican los 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	(27)	4	(13)	8	(14)	12	(27)	100.0	(100)
Ecuador	82	(185)	53	(117)	30	(68)	83	(185)	100.0	(100)
El Salvador	6	(7)	6	(7)			6	(7)	100.0	(100)
España—Spain	5	(8)		(1)	5	(7)	5	(8)	100.0	(100)
Guatemala	2	(5)	2	(5)			2	(5)	100.0	(100)
México	62	(125)	34	(67)	28	(58)	62	(125)	100.0	(100)
Nicaragua	5	(14)	3	(7)	2	(7)	5	(14)	100.0	(100)
Panamá	14	(35)	6	(18)	8	(17)	14	(35)	100.0	(100)
United States—Estados Unidos	2	(2)	2	(2)			2	(2)	100.0	(100)
Vanuatu	1	(1)	1	(1)			1	(1)	100.0	(100)
Venezuela	17	(43)	10	(23)	7	(20)	17	(43)	100.0	(100)
Total	209	(452)	121	(261)	88	(191)	209	(452)	100.0	(100)