INTER-AMERICAN TROPICAL TUNA COMMMISSION
COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

QUARTERLY REPORT—INFORME TRIMESTRAL

October-December 2013—Octubre-Diciembre 2013

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 third quarter of 2013.

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 63rd 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

Meetings

IATTC meetings

The following IATTC and IDCP meetings took place in Del Mar, California, USA, on 14-18 October 2013:

Date(s)	Number	Meeting
14-15 Oct.	86	IATTC (extraordinary)
17 Oct.	33	Permanent Working Group on Tuna Tracking
17 Oct.	19	Working Group to Promote and Publicize the AIDCP Dolphin-Safe Tuna Certification System
17 Oct.	54	International Review Panel
18 Oct.	28	Parties [to the AIDCP]

Other meetings

Dr. Richard B. Deriso participated in a meeting of the Science and Statistical Committee of the Western Pacific Regional Fishery Management Council in Honolulu, Hawaii, USA, on 8-10 October 2013.

Dr. Robert J. Olson and Ms. Leanne M. Duffy participated in a workshop to analyze a global data set on trophic relations of tunas and other pelagic fishes at the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Mathematics Informatics and Statistics in Adelaide, Australia, on 14-18 October 2013. The workshop was sponsored by CSIRO and IMBER-CLIOTOP (Integrated Marine Biogeochemistry and Ecosystem Research-Climate Impact on Oceanic Top Predators). The purpose of the workshop was (1) to use classification tree methodology to analyze broad-scale spatial, physical, and biological covariates with diet data for several species that occupy various pelagic habitats, and (2) to elucidate links to large-scale oceanography, which is susceptible to climate change. Presentations were given by both Dr. Olson and Ms. Duffy.

Dr. Mark N. Maunder participated in a Scientific Committee Meeting of the South Pacific Regional Fisheries Management Organisation (SPRFMO) in La Jolla, California, USA, on 21-27 October 2013. The SPRFMO is an inter-governmental organization that is committed to the long-term conservation and sustainable use of the fishery resources of the South Pacific Ocean and, in so doing, safeguarding the marine ecosystems in which the resources occur. The organization consists of a Commission and several subsidiary bodies. The members of the Commission are Australia, Belize, Chile, China, the Cook Islands, Cuba, Denmark (in respect to the Faroe Islands), the European Union, New Zealand, the Republic of Korea, the Russian Federation, and Chinese Taipei.

Dr. Carolina Minte Vera participated in the an intercessional (data-preparation) workshop of the Albacore Working Group of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean, in Shimizu, Shizuoka, Japan, on 5-12 November 2013. The chairman of the working group was Dr. John Holmes (Department of Fisheries and Oceans of Canada) and the local host was Dr. Keisuke Satoh (National Research Institute of Far Seas Fisheries of Japan). The objectives of the workshop were to: (1) define fisheries and review input data series for consistency with those definitions and conflicts in primary data sources; (2) assess catch-per-unit-of-effort indices for inclusion in the model, using criteria adopted by the working group at the Shanghai workshop that took place in March 2013; (3) develop data-weighting procedures and review model parameterization, assumptions, and diagnostic tools for the base-case model and future projections; and (4) develop a project charter that describes the expectations for the base case and projections for a stock assessment meeting that will take place in April 2014.

Mr. Kurt M. Schaefer participated at the "Pacific Bluefin and North Pacific Albacore Tuna Age Determination Workshop" at the National Research Institute of Far Seas Fisheries in Shimizu, Shizuoka, Japan, on 13-16 November 2013. Mr. Schaefer presented an overview of published investigations on age and growth of yellowfin, bluefin, and bigeye tunas in the eastern Pacific Ocean by IATTC staff members. His travel expenses were covered by the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC).

Mr. Ernesto Altamirano Nieto participated in the fourth training session for observers of the European observer program, Programa Nacional de Observadores Tropicales (PNOT) on 11-22 November 2013, at the new facilities of the Instituto Oceanográfico Español at Santa Cruz de Tenerife, in the Canary Islands, Spain. Fifteen observers were trained. Mr. Altamirano's travel expenses were paid by the Spanish administration through the Organización de Productores Asociados de Grandes Atuneros Congeladores.

A mid-term review of the SATREPS (Science and Technology Research Partnership for Sustainable Development) project described in the Early Life History section was carried out at the Achotines Laboratory and in Panama, R.P., on 11-27, November 2013. A review panel consisting of staff members of the Japan International Cooperation Agency (JICA), the Japan Science and Technology Agency (JST), Kinki University, the IATTC, and the Autoridad de Recursos Acuáticos de Panamá (ARAP) was joined by an independent consultant at both locations, where they met with project participants to discuss progress and ways to improve the research activities for the remainder of the project. During the same period the annual Joint Coordination Committee (JCC) meeting for the project was carried out. The overall mid-term evaluation of the project by the evaluation panel was high, and the mission leader noted that this project was being used as a model project example by JST and was one of the most successful of the 60 projects being carried out worldwide by JICA and JST.

Dr. Guillermo A. Compean participated in the 10th Regular Session of the Western and Central Pacific Fisheries Commission in Cairns, Australia, on 2-6 December 2013.

Dr. Martín A. Hall participated in a meeting, International Masters Program in Marine Biodiversity and Conservation, at the Centro de Ciências do Mar, Universidade do Algarve, Faro, Portugal, on 5-6 December 2013, at which he gave the following presentations:

1. Bycatch: Introduction, Definitions, Management Objectives, Approaches to Mitigation;
2. Solving the Bycatch Problems: Incentives, Strategies (Example Sea Turtles-Longlines);
3. Bycatch Management Options (Examples: Tuna-Dolphin and Others. Spatial Approaches);
4. Beyond the Numbers. Bycatches and Ecosystem Based Fisheries Management.

Dr. Robert J. Olson and Ms. Leanne M. Duffy participated in the 2013 California Cooperative Oceans Fisheries Investigations Conference in La Jolla, California, USA, on 9-11 December 2013, at which the following paper was presented by its senior author:

Hunsicker, Mary, Tim Essington, Robert Olson, and Leanne Duffy. Evidence of increased cephalopod production in the eastern tropical Pacific Ocean**.**

Dr. Michael D. Scott was a co-author of the following oral presentations that were given at the 20th Biennial Conference on The Biology of Marine Mammals, held in Dunedin, New Zealand, on 9-13 December 2013:

Patterns of Seasonal Metabolic Rate Variation for Bottlenose Dolphins in Sarasota Bay, Florida, by D. Costa, G. Worthy, R. Wells, A. Read, D. Waples, and M. Scott;

Experimental Tests of Small Electronic Tags for Dolphins, by R. Wells, B. Balmer, L. Howle, M. Scott, D. Fauquier, A. Barleycorn, K. McHugh, J. Allen, B. Irvine, F. Townsend, J. Sweeney, and S. Wilton.

Dr. Cleridy Lennert-Cody participated in the ISC North Pacific Shark CPUE Standardization Workshop in Honolulu, Hawaii, USA, on 9-13 December 2013. (ISC stands for International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean.)

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 catches of 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. 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. 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 of 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.

IATTC personnel stationed at its field offices collected 258 length-frequency samples from 162 wells and abstracted logbook information for 215 trips of commercial fishing vessels during the fourth quarter of 2013.

Reported fisheries statistics

The information reported herein is for the eastern Pacific Ocean (EPO: the region east of 150ºW, south of 50ºN, and north of 50°S), unless noted otherwise. The catches are reported in metric tons (t), vessel capacities in cubic meters (m^3), and effort in days 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 of 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. The statistics are developed using data from many sources, including scientific observers, fishing vessel logbooks, reports of landing, and data compiled by governmental agencies.

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 (http://www.iattc.org/VesselListsENG.htm). The estimated total fish-carrying capacity of the purse-seine and pole-and-line vessels that have or are expected to fish in the EPO during 2013 is about 212,000 m^3 (Table 1). The average weekly at-sea capacity for the fleet, for the weeks ending 1 October through 31 December, was about 113,100 m^3 (range: 32,500 to 185,600 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 (t) of tropical tunas from the EPO during the period of January-December 2013, and comparative statistics for 2008-2012, were:

Species	2013	2008-2012			Weekly average, 2013
		Average	Minimum	Maximum	
Yellowfin	221,800	214,00	193,700	235,100	3,900
Skipjack	270,100	247,400	170,700	297,500	5,100
Bigeye	49,600	52,000	44,100	60,000	1,000

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 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 carrying capacity.

The estimated nominal catches per day of fishing for yellowfin, skipjack, and bigeye in the EPO during the third quarter of 2013 and comparative statistics for 2008-2012 were:

Region	Species	Gear	2013	2008-2012		
				Average	Minimum	Maximum
N of 5° N	Yellowfin	PS	14.9	12.3	10.9	14.0
S of 5° N			2.3	3.0	2.4	3.5
N of 5° N	Skipjack	PS	2.7	2.1	0.8	3.5
S of 5° N			10.1	9.7	7.5	11.4
EPO	Bigeye	PS	2.5	2.5	2.3	3.1
EPO	Yellowfin	LP	0	4.9	2.3	9.2
EPO	Skipjack	LP	0	0.7	0.4	1.1

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-11-01-Tuna-conservation-2011-2013 paragraph 10) Preliminary estimates of the catches reported for January-December 2013 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 and pole-and-line vessels in the EPO are collected by IATTC personnel at ports of landing in Ecuador, Mexico, Panama, 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 third quarter of 2008-2013 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 third quarter of 2013, and the second shows data for the combined strata for the third quarter of each year of the 2008-2013 period. Samples from 200 wells were taken during the third quarter of 2013.

There are ten surface fisheries for yellowfin defined for stock assessments: four associated with floating objects, two with unassociated tuna schools, three associated with dolphins, and one pole-and-line (Figure 1). The last fishery includes all 13 sampling areas. Of the 200 wells sampled that contained fish caught during the third quarter of 2013, 167 contained yellowfin. The estimated size compositions of these fish are shown in Figure 2a. The majority of the yellowfin catch during the third quarter was taken by sets on dolphins in the Northern and Inshore areas. Lesser amounts of smaller sized yellowfin were taken in the Northern unassociated fishery and in the Equatorial and Inshore floating object fisheries.

The estimated size compositions of the yellowfin caught by all fisheries combined during the third quarters of 2008-2013 are shown in Figure 2b. The average weight of yellowfin caught during the third quarter of 2013 (6.8 kg) was considerably less than those of the previous five years, which were all 9.9 kg or greater.

There are eight fisheries for skipjack defined for stock assessments: four associated with floating objects, two with unassociated tuna schools, one associated with dolphins, and one pole-and-line (Figure 1). Each of the last two fisheries includes all 13 sampling areas. Of the 200 wells sampled that contained fish caught during the third quarter of 2013, 119 contained skipjack. The estimated size compositions of these fish are shown in Figure 3a. Large amounts of skipjack in the 60- to 70-cm range were caught in the Equatorial and Inshore floating-object fisheries, with lesser amounts of smaller skipjack caught in all of the floating-object fisheries and in the Northern and Southern unassociated fisheries.

The estimated size compositions of the skipjack caught by all fisheries combined during the third quarters of 2008-2013 are shown in Figure 3b. The average weight of skipjack caught during the third quarter of 2013 (2.6 kg) was greater than those of any other year of the 2008-2013 period, except for 2008, which was 2.7 kg.

There are seven surface fisheries for bigeye defined for stock assessments: four associated with floating objects, one with unassociated tuna schools, one associated with dolphins, and one pole-and-line (Figure 1). Each of the last three fisheries includes all 13 sampling areas. Of the 200 wells sampled that contained fish caught during the third quarter of 2013, 29 contained bigeye. The estimated size compositions of these fish are shown in Figure 4a. The greatest portion of the bigeye catches during the third quarter came from the Northern floating-object fishery, with lesser amounts from the Equatorial and Southern floating-object fisheries. A small amount of large (120-145 cm) bigeye was taken in the unassociated fishery.

The estimated size compositions of the bigeye caught by all fisheries combined during the third quarter of 2008-2013 are shown in Figure 4b. The average weight of bigeye caught during the third quarter of 2013 (4.1 kg) was less than those of the previous five years, which ranged from 4.7 to 7.8 kg.

The estimated retained purse-seine catch of bigeye less than 60 cm in length during the third quarter of 2013 was 4,210 metric tons (t), or about 37 percent of the estimated total retained purse-seine catch of bigeye during that period. The corresponding amounts for 2008-2012 ranged from 2,467 to 9,601 t, or 16 to 46 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

Although courtship behavior and pre-spawning activities of the yellowfin broodstock at the Achotines Laboratory were observed on many occasions there was no spawning in Tank 1 during the quarter. The temperatures in the tank ranged from 27.6° to 28.6°C. The sustained cessation of spawning during the quarter was likely related to a small number of older broodstock fish in the tank and the presence of newly stocked younger fish. At the end of the quarter there were one 44-kg yellowfin, two 33-kg yellowfin, and eight 14- to 22-kg yellowfin in Tank 1.

An additional nine yellowfin (<6 kg) were stocked in the reserve Tank 2 (170,000 L). At the end of the quarter there were 11 fish in the tank. Most of these were to be transferred to Tank 1 during January 2014.

Comparative studies of yellowfin and Pacific bluefin larvae

A joint Kinki University (KU)-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 IATTC 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. The research on Pacific bluefin, which is conducted at the Fisheries Laboratories of KU in Wakayama Prefecture, Japan, is being supported by the Japan Science and Technology Agency (JST).

As part of the SATREPS project, numerous KU professors, graduate students, and post-doctoral researchers visited the Achotines Laboratory from early October through late November. The KU scientists worked with ARAP biologists and IATTC Achotines staff members to continue SATREPS research investigations of the genetics, nutrition, and early life history of yellowfin. Although there was no yellowfin spawning during their visits, the KU scientists continued to analyze genetic samples of yellowfin collected previously, continued analysis of weaning diets to be used in future rearing trials with yellowfin juveniles, and conducted comparative trials of enrichment media used to nutritionally enhance zooplankton prey of yellowfin larvae.

A mid-term review of the SATREPS project was carried out at the Achotines Laboratory and in Panama, R.P., on 11-27 November, 2013. A review panel consisting of staff members of the JICA, the JST, KU, the IATTC's Early Life History (ELH) Group, and ARAP was joined by an independent consultant at both locations, where they met with project participants to discuss progress and ways to improve the research activities for the remainder of the project. During the same period the annual Joint Coordination Committee (JCC) meeting for the project was carried out. The overall mid-term evaluation of the project by the evaluation panel was high, and the mission leader noted that this project was being used as a model project example by JST and was one of the most successful of the 60 projects being carried out worldwide by JICA and JST.

Effects of ocean acidification on yellowfin eggs and larvae

During October and November 2011, two experiments designed to examine the effects of a range of pH levels on the survival, development, and growth of eggs and larvae of yellowfin tuna were conducted at the Achotines Laboratory. The trials were conducted by the IATTC's Early Life History Group and collaborators from the Secretariat of the Pacific Community (SPC), Noumea, New Caledonia, Macquarie University, Sydney, Australia, and the University of Gothenburg, Stromstad, Sweden (see Quarterly Report for October-December 2011). The experiments were designed to estimate the potential impacts of ocean acidification on the early life stages of tropical tunas. During the fourth quarter, final analyses of the experimental results were completed and a manuscript was submitted and provisionally accepted by a scientific journal, with publication expected during the second quarter of 2014. The experiments investigated the potential effects of ocean pH levels on yellowfin egg stage duration, larval growth, and larval survival. The ocean pH levels tested ranged from present-day levels to levels predicted by ocean acidification models to occur within the next 100 to 300 years, and to more extreme levels. The results indicated the potential for significantly reduced larval survival at pH levels predicted over the next 300 years, and significantly reduced growth and significantly increased egg hatching times at pH levels predicted to occur during the next 100 years. Further studies are indicated in order to confirm these experimental results and to extend the analysis to modeling-based approaches to assess the effects of ocean acidification on tropical tuna resources.

Studies of snappers

The work on snappers (*Lutjanus* spp.) is carried out by the 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 had been unsuccessful in recent years. During the second quarter of 2013, a major fishing effort was undertaken, and more than 100 spotted rose snappers were collected in local waters. At the end of the fourth quarter a large group of fish continued to be held in the broodstock snapper tank.

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 were spots of cool water along the Equator during January-February 2013 and offshore off Mexico and far offshore south 20°S during January-March 2013 (IATTC Quarterly Report for January-March 2013: Figure 8). During April 2013 the SSTs were mostly normal, except for a narrow band of cool water close to the coast of Peru and some warm water far offshore south of about 15°S. During May and June the area of cool water expanded westward along the equator to slightly west of 120°W (IATTC Quarterly Report for April-June 2013: Figure 5). During July, August, and September this band retreated eastward. However a spot of cool water appeared at about 20°S-125° to 140°W in September (IATTC Quarterly Report for July-September 2013: Figure 5). This spot of cool water had disappeared by October, but there were areas of cool water near the coast off the Baja California peninsula and off South America from the Equator to about 35°S. In November most of this cool water had disappeared, except for two spots off South America between the Equator and 10°S. During December the SSTs were very close to normal throughout the entire tropical eastern Pacific Ocean (Figure 5). The SSTs were mostly below normal from January through December 2013 (Table 4). The value of 8.00 for the NOI* for February 2013 is particularly noteworthy, as it has been exceeded only four times (8.68 in January 1989, 8.10 in December 1998, 8.06 in January 2007, and 8.12 in March 2008) during the period since 1948 for which records exist. According to the Climate Diagnostics Bulletin of the U.S. National Weather Service for December 2013, "ENSO [El Niño-Southern Oscillation]-neutral is expected to continue into the Northern Hemisphere summer 2014."

BYCATCH PROGRAM AND INTERNATIONAL DOLPHIN CONSERVATION PROGRAM

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 eastern Pacific Ocean (EPO). This mandate is carried out by the IDCP 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, Venezuela and the Regional Observer Program (ROP) under the umbrella of the Western and Central Pacific Fisheries Commission (WCPFC), based on a Memorandum of Cooperation (MOC) signed by representatives of the IATTC and the WCPFC.

In addition, Resolution C-12-08 of the IATTC indicates that "Any vessel [regardless of size class] with one or more of its wells sealed to reduce its well volume recorded on the Regional Vessel Register shall be required to carry an observer from the International Dolphin Conservation Program (IDCP) on board." Furthermore, Resolution C-12-01 allows Class-4 purse-seine vessels (vessels with fish-carrying capacities of 182 to 272 metric tons) to make a single fishing trip of up to 30 days duration during the specified closure periods, provided that that vessel carries an observer of the IDCP On-Board Observer Program.

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 2013 the observer programs of Colombia, the European Union, Mexico, Nicaragua, Panama, and Venezuela were 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 IDCP 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 IDCP On-Board Observer Program is not practical. In 2011, the IATTC and the WCPFC agreed on the MOC described above. As part of the implementation of the MOC, representatives of the two organizations put together a series of procedures for the observers of the ROP to follow under the umbrella of the WCPFC for tuna purse seiners, while observing fishing activity in the IATTC convention area. Under that MOC, two parties to both regional fisheries management organizations, and to the AIDCP, requested that cross-endorsed observers be allowed to be deployed on 13 trips of vessels planning to operate in both areas during the third quarter of 2013. These requests were granted.

Observers from the IDCP On-Board Observer Program departed on 115 fishing trips aboard purse seiners covered by that program during the fourth quarter of 2013. Preliminary coverage data for these vessels during the quarter are shown in Table 5. Eight of these trips were made on Class-4 purse seiners (182 to 272 metric tons of fish-carrying capacity). Only Class-6 purse-seine vessels are required to carry observers on all fishing trips in the EPO. There are three reasons why a smaller vessel would carry an observer. First, it might have been required to carry an observer because it had been reported to have made one or more sets on tunas associated with dolphins, which vessels other than Class-6 vessels are not permitted to do by the AIDCP. Second, Paragraph 4 of IATTC Resolution C-12-01, adopted at the 83rd meeting of the IATTC in June 2012, specifies that a Class-4 purse seiner may make one trip of not more than 30 days duration during the closure period applying to that vessel, provided there is an observer aboard the vessel. Third, IATTC Resolution C-12-08, also adopted at the 83rd meeting of the IATTC, requires that "any vessel with one or more of its wells sealed to reduce its well volume recorded on the Regional Vessel Register shall be required to carry an observer from the [IDCP]." The eight trips by Class-4 vessels in Table 5 were made on vessels making one 30-day trip during the selected closure period under the above-stated resolution.

Training

There were no observer training sessions held during the fourth quarter of 2013.

Gear project

There were no dolphin safety-gear inspections and safety-panel alignment procedures carried out aboard purse seiners during the fourth quarter of 2013.

PUBLICATIONS

Hall, Martin, and Marlon Roman. 2013. Bycatch and non-tuna catch in the tropical tuna purse seine fisheries of the world. FAO Fish. Aqua. Tech. Pap., 568: ix, 249 pp.

The following 4 papers, and 18 others, were published in a special issue of Deep Sea Research Part II: Topical Studies in Oceanography devoted entirely to "The role of squids in pelagic ecosystems." Drs. Jock W. Young of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) of Australia, Robert J. Olson, and Paul G.K. Rodhouse of the British Antarctic Survey of the UK were co-guest editors of all 22 papers.

Rodhouse, Paul G.K., Robert J. Olson, and Jock W. Young. 2013. Dedication: Malcolm Clarke, his life and work. Deep Sea Res. II Top. Stud. Oceanogr., 95: 1-2.

Young, Jock W., Robert J. Olson, and Paul G.K. Rodhouse. 2013. The role of squids in pelagic ecosystems: an overview. Deep Sea Res. II Top. Stud. Oceanogr., 95: 3-6.

Coll, Marta, Joan Navarro, Robert J. Olson, and Villy Christensen. 2 013. Assessing the trophic position and ecological role of squids in marine ecosystems by means of food-web models. Deep Sea Res. II Top. Stud. Oceanogr., 95: 21-36.

Navarro, Joan, Marta Coll, Christoper J. Somes, and Robert J. Olson. 2013. Trophic niche of squids: insights from isotopic data in marine systems worldwide. Deep Sea Res. II Top. Stud. Oceanogr., 95: 93-102.

According to the Elsevier Usage Report, the second article was downloaded or viewed 194 times by the end of October 2013.

INTER-AGENCY COOPERATION

Dr. Michael D. Scott gave a series of lectures on the Biology of Marine Mammals at the University of San Diego during September-December 2013.

VISITING SCIENTISTS

La Jolla

Ms. Liliana Roa Pascuali, a citizen of Colombia, a Ph.D. candidate at the Université de Montpellier II, Montpellier, France, and currently working at the Centre de Recherche Halieutique Méditerranéenne et Tropicale in Sète, France, spent the period of 8 July-1 October 2013, working with Dr. Martín A. Hall on characterization of the oceanographic environment of tropical tunas in the eastern Pacific Ocean, using data on the purse-seine fishery in that region.

Mr. Moisés Mug Villanueva, a consultant to the Ministerio de Agricultura y Ganadería of Costa Rica, spent the period of 12-22 November 2013 at the IATTC headquarters in La Jolla, where he discussed matters of interest to the Costa Rican government with IATTC staff members.

Achotines Laboratory

As part of the joint yellowfin-Pacific bluefin project discussed above, Dr. Yang-Su Kim, a Kinki University (KU) post-doctoral fellow, and Mr. Tomoki Honryo, a KU staff member, arrived at the Achotines Laboratory on 9 October 2013. They were joined later in the month by other KU professors, graduate students, and post-doctoral researchers to work with ARAP scientists and IATTC Achotines staff members who were already there. This period of joint research activity at the Achotines Laboratory continued through 26 November 2013.

ADMINISTRATION

Mr. Alejandro Perez resigned his position at the IATTC effective 31 December 2013 to continue his studies for a doctoral degree in industrial engineering at a university in Spain. Mr. Perez was hired in February 2007 to work in the Data Collection and Database Program, for which he worked on a wide variety of projects, from processing data requests to redesigning the flow of data processing, storage, and organization, designing and implementing reporting data bases and reporting routines, which sped up and optimized the generation of yearly data summaries, reports, and analyses of data sets. From 2009 through December 2013 Mr Perez worked from Spain, while concurrently studying for his master's degree in Statistical Learning and Data Mining, which he expects to receive in early 2014. Mr. Perez brought a well-established technical knowledge to the IATTC, and performed his duties in an excellent fashion. Due to his comprehensive knowledge of the IATTC data base systems, he may continue to work with the IATTC in the future as a consultant for specific programming jobs, as the needs arise.

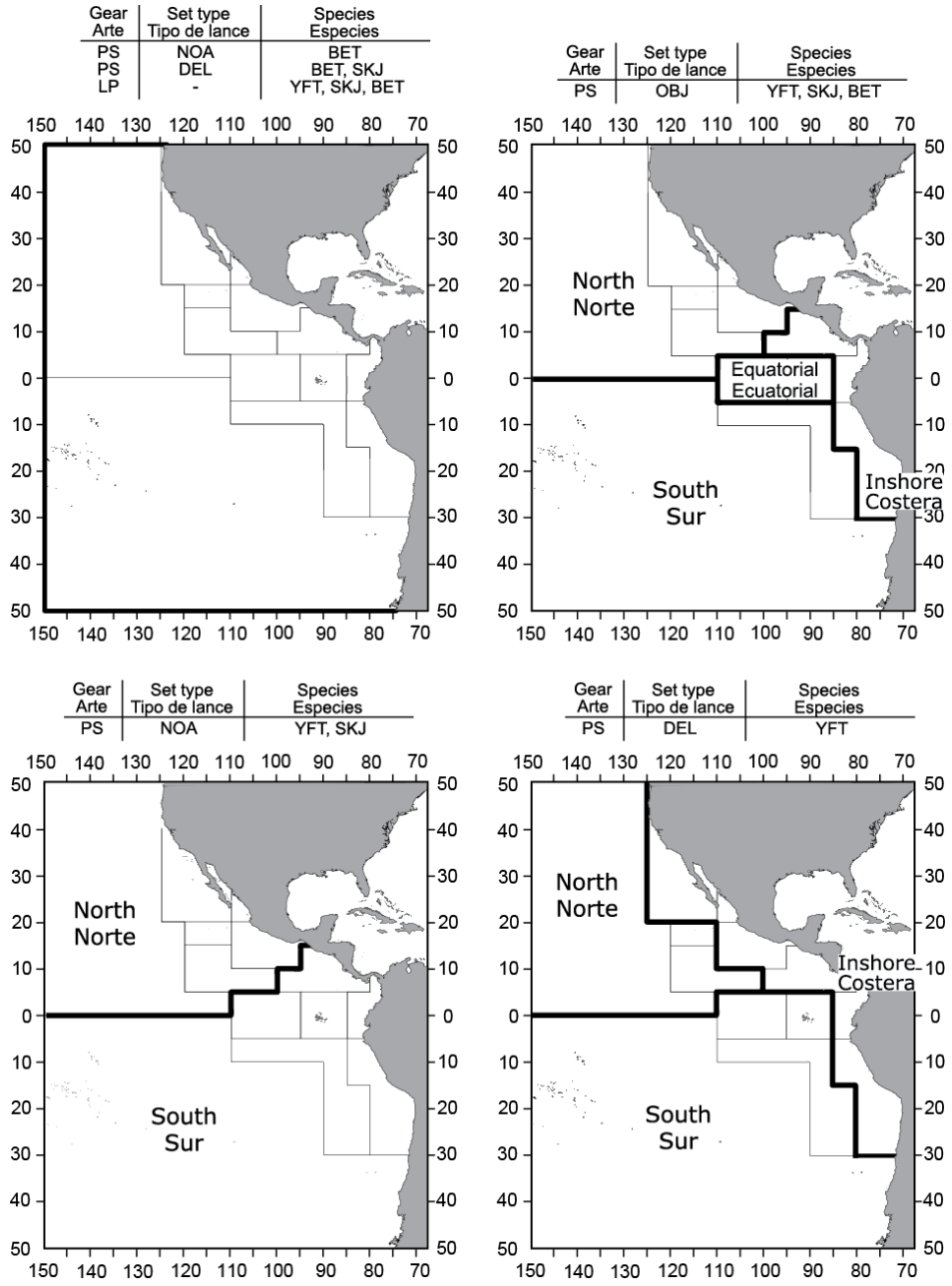

FIGURE 1. Spatial extents of the fisheries defined by the IATTC staff for stock assessment of yellowfin, skipjack, and bigeye in the EPO. The thin lines indicate the boundaries of the 13 length-frequency sampling areas, and the bold lines the boundaries of the fisheries. Gear: PS = purse seine, LP =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

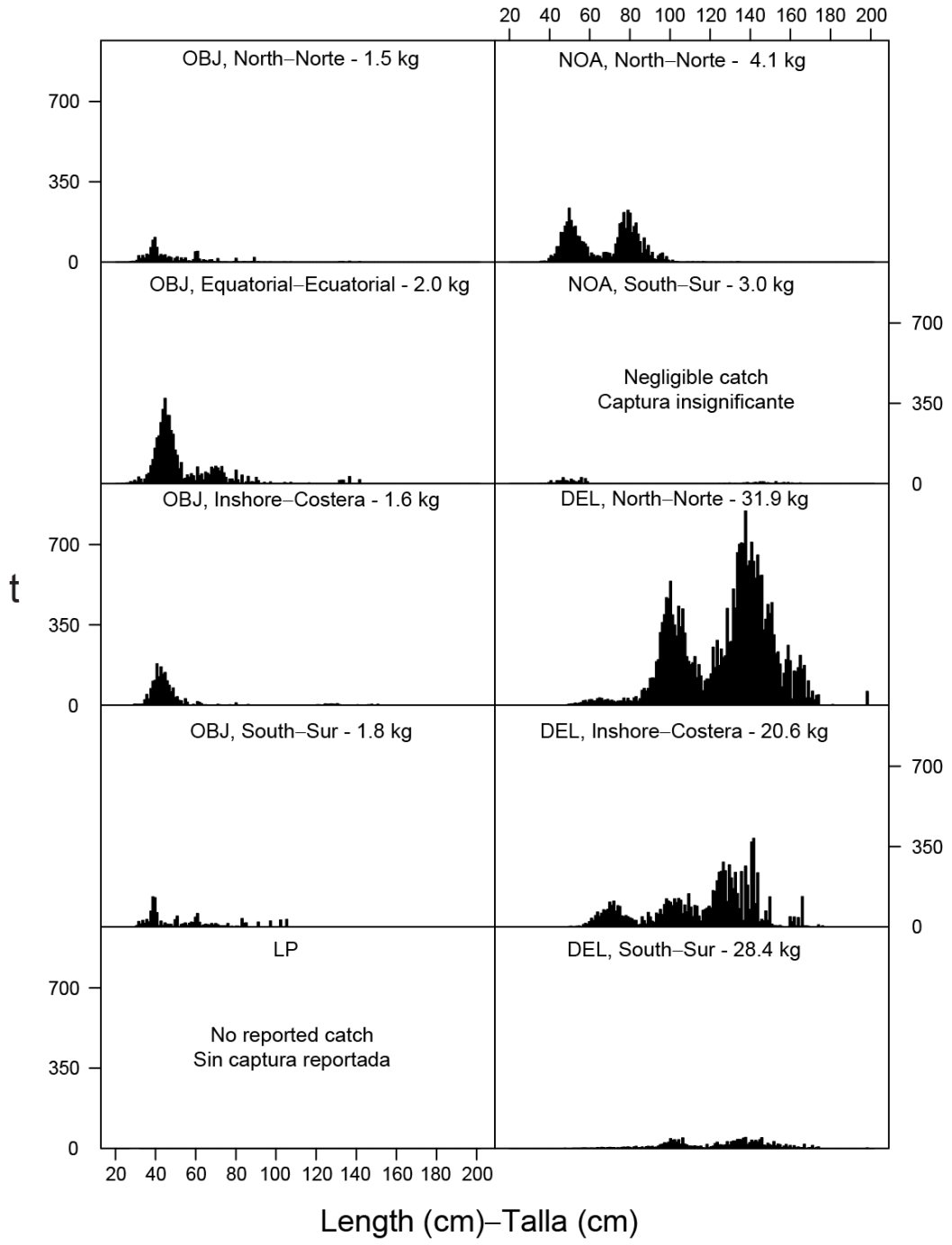

FIGURE 2a. Estimated size compositions of the yellowfin caught in each fishery of the EPO during the third quarter of 2013. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 2a. Composición por tallas estimada para el aleta amarilla capturado en cada pesquería del OPO durante el tercer trimestre de 2013. 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.

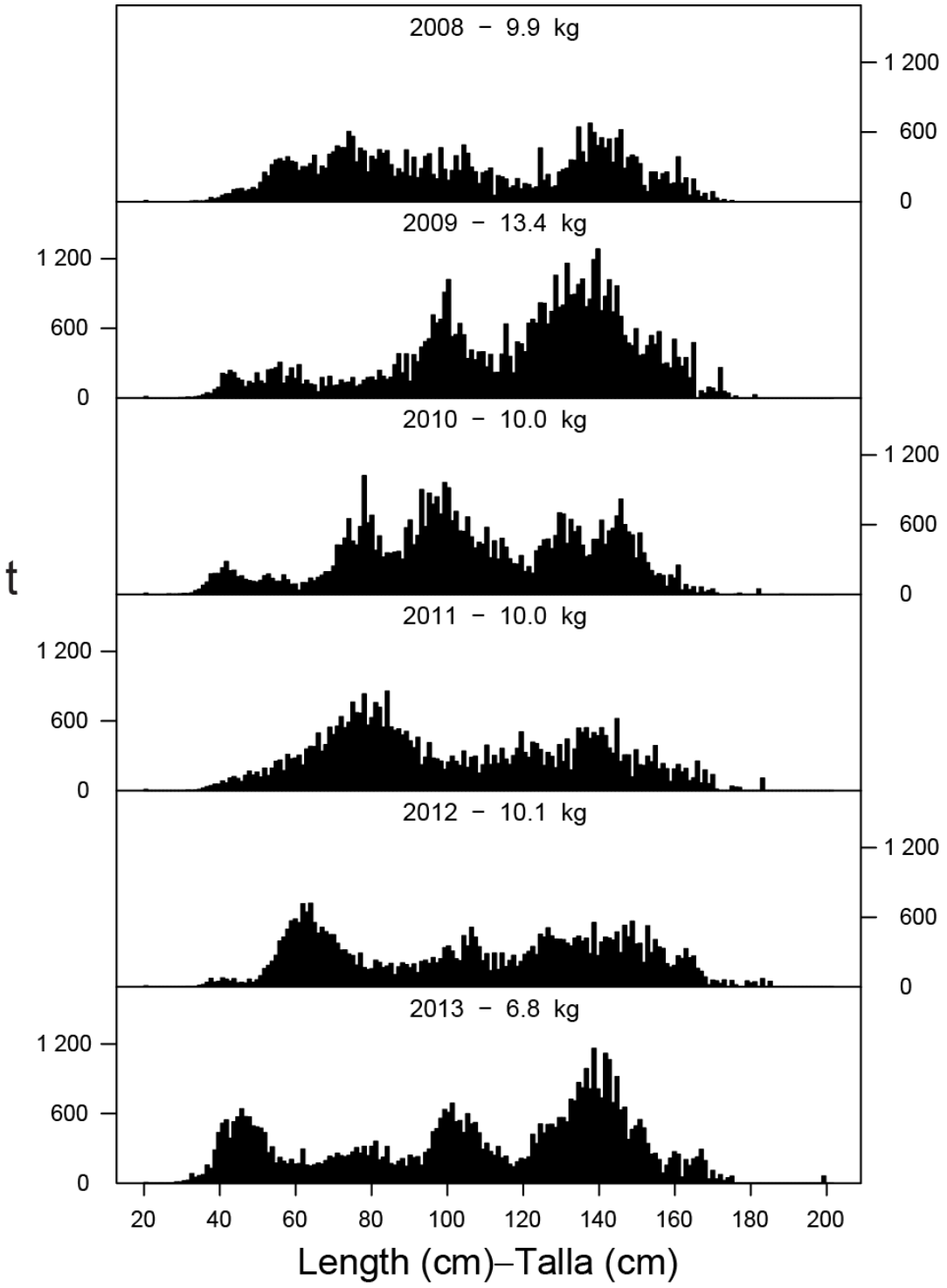

FIGURE 2b. Estimated size compositions of the yellowfin caught in the EPO during the third quarter of -2013. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 2b. Composición por tallas estimada para el aleta amarilla capturado en el OPO en el tercer trimestre de 2007-2013. En cada recuadro se detalla el peso promedio de los peces en las muestras; t = toneladas métricas.

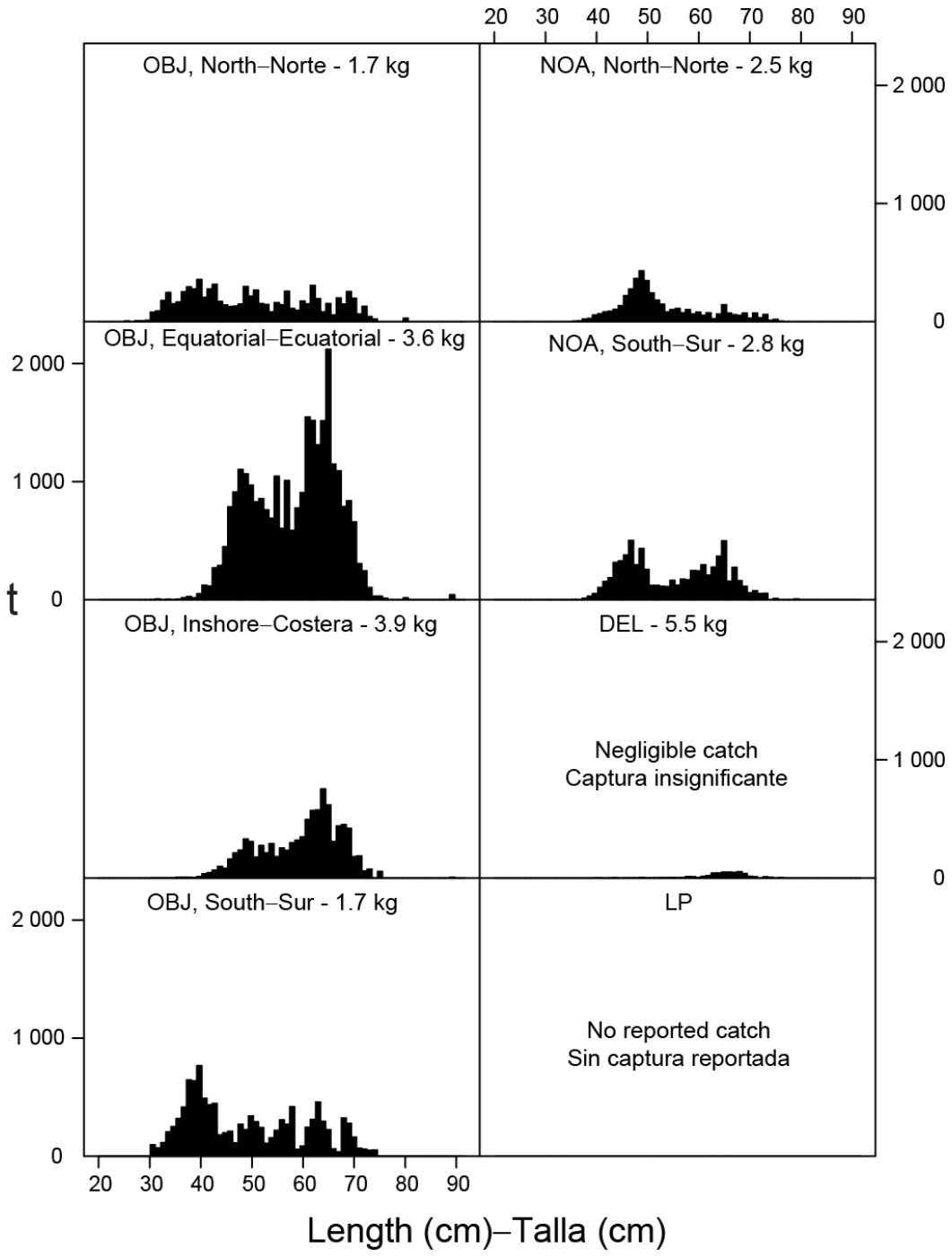

FIGURE 3a. Estimated size compositions of the skipjack caught in each fishery of the EPO during the third quarter of 2013. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 3a. Composición por tallas estimada para el barrilete capturado en cada pesquería del OPO durante el tercer trimestre de 2013. 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.

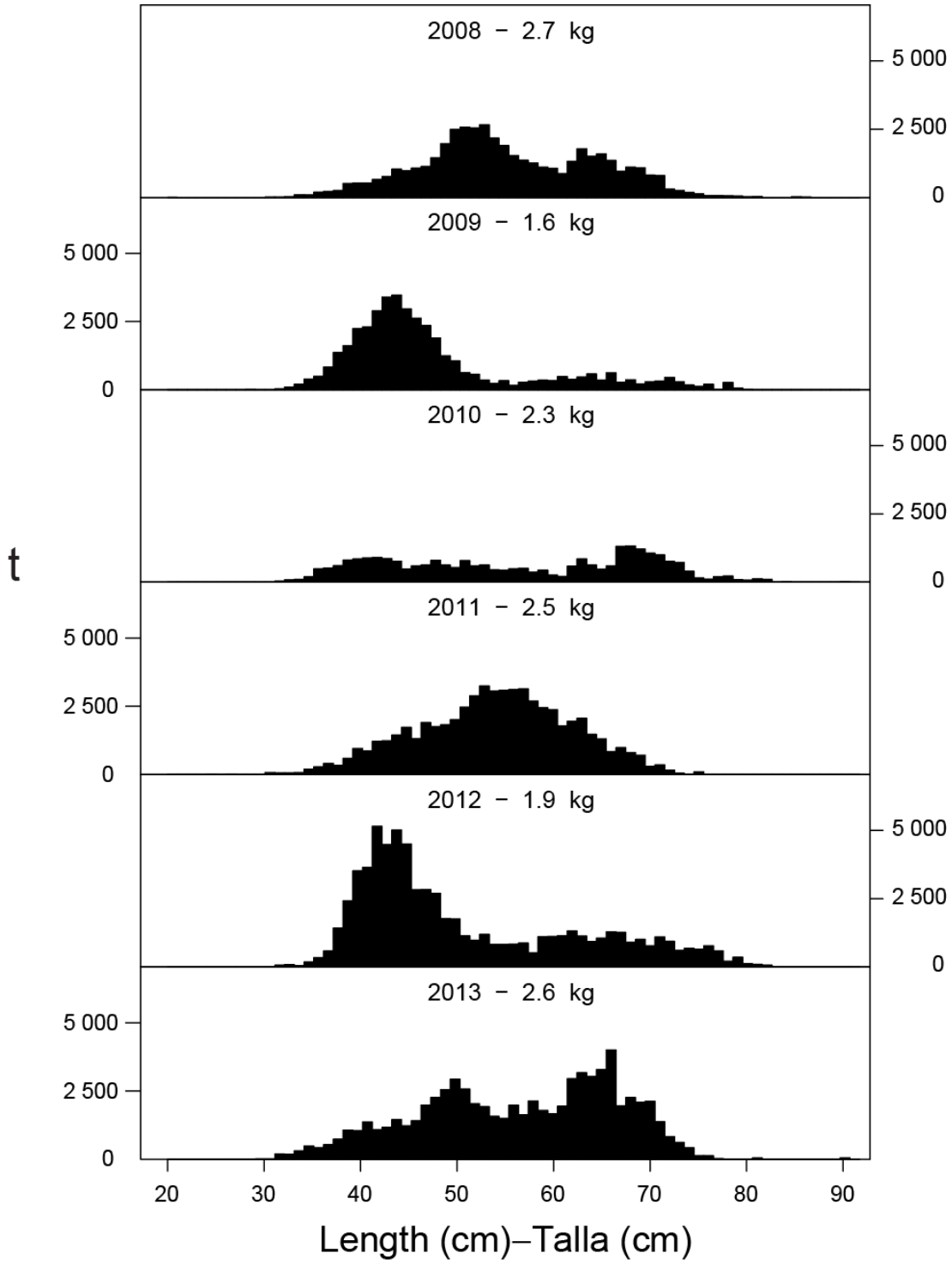

FIGURE 3b. Estimated size compositions of the skipjack caught in the EPO during the third quarter of 2007-2013. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 3b. Composición por tallas estimada para el barrilete capturado en el OPO en el tercer trimestre de 2007-2013. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas.

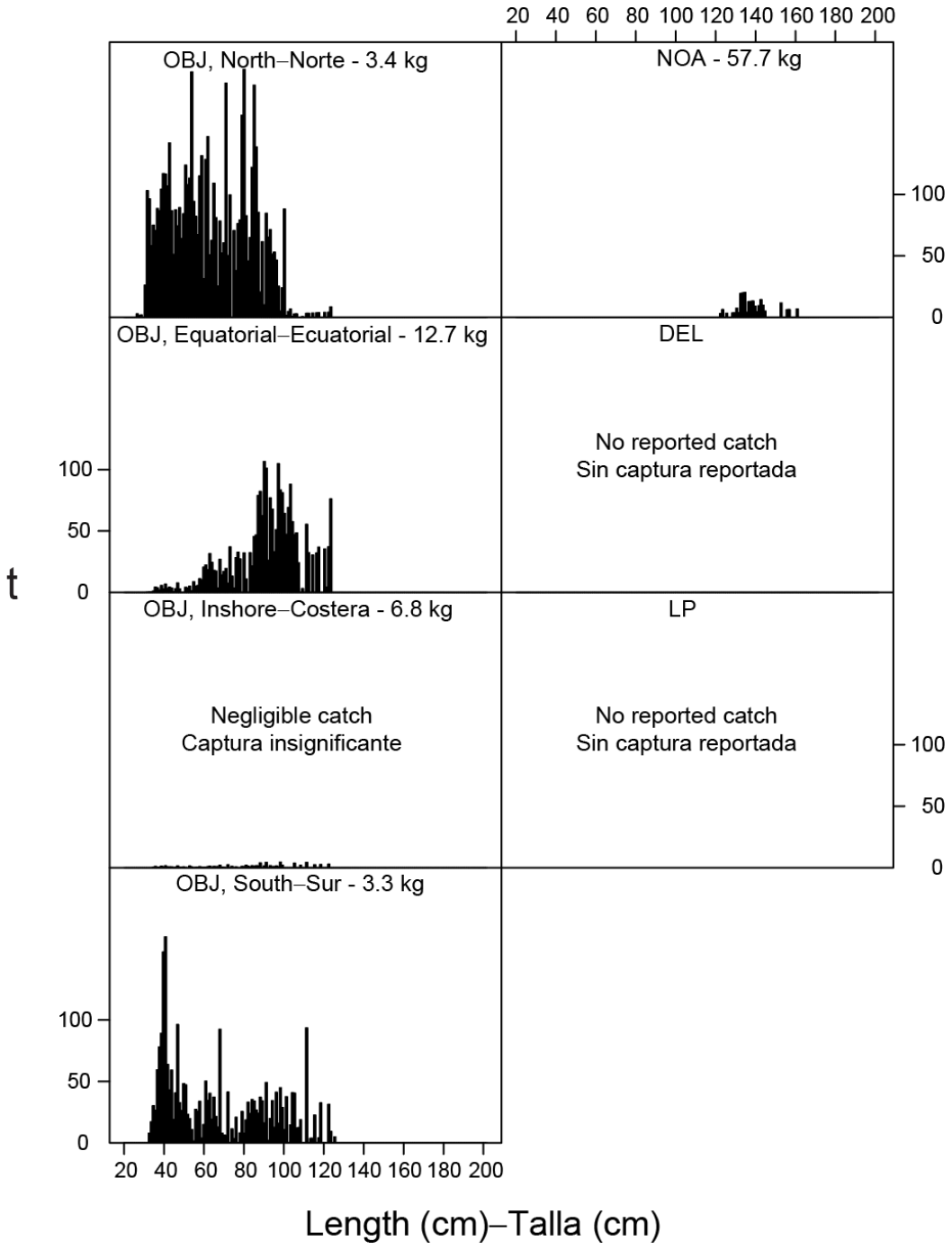

FIGURE 4a. Estimated size compositions of the bigeye caught in each fishery of the EPO during the third quarter of 2013. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 4a. Composición por tallas estimada para el patudo capturado en cada pesquería del OPO durante el tercer trimestre de 2013. 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.

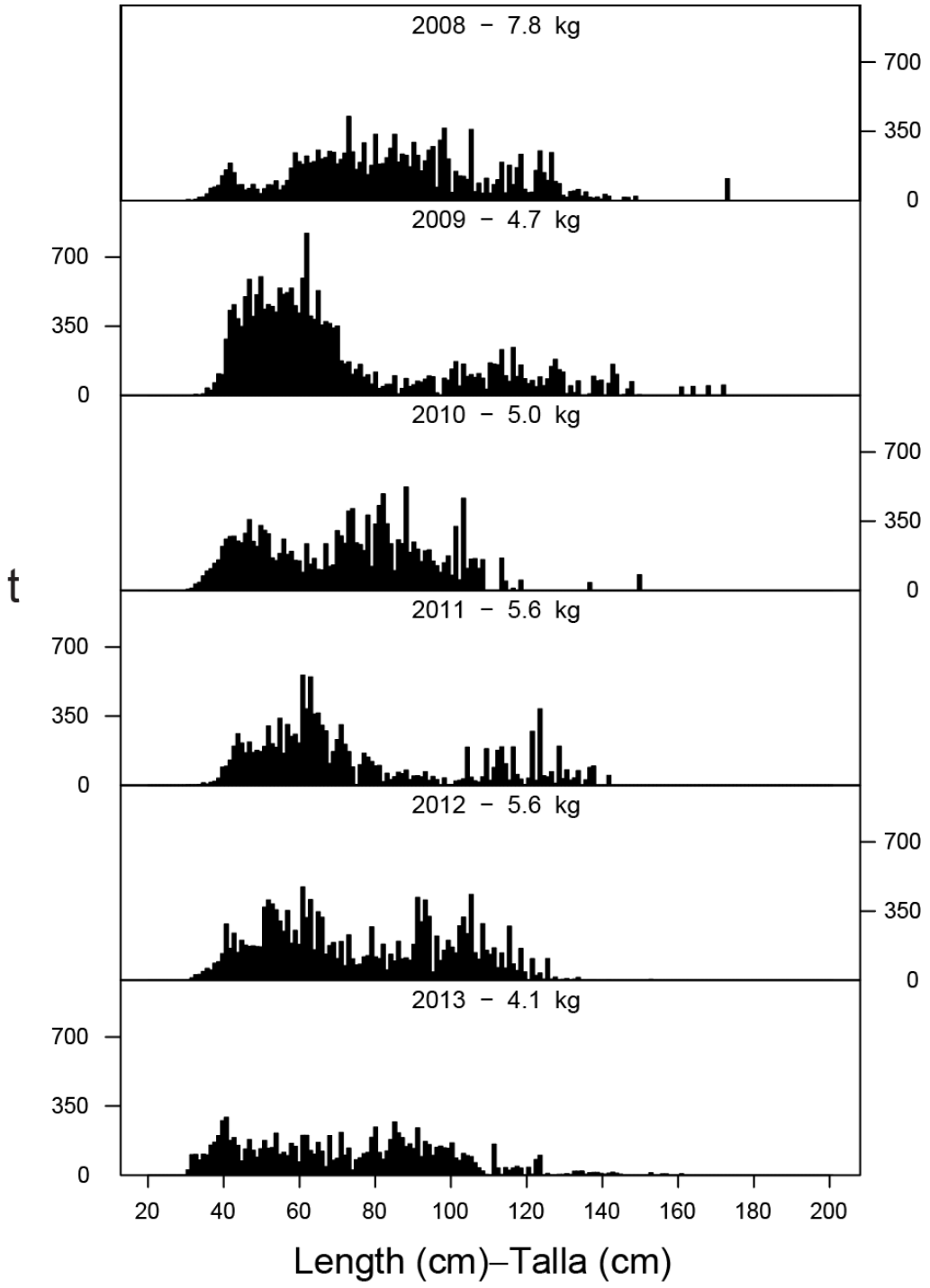

FIGURE 4b. Estimated size compositions of the bigeye caught in the EPO during the third quarter of 2007-2013. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 4b. Composición por tallas estimada para el patudo capturado en el OPO en el tercer trimestre de 2007-2013. En cada recuadro se detalla el peso promedio de los peces en las muestras; t = toneladas métricas.

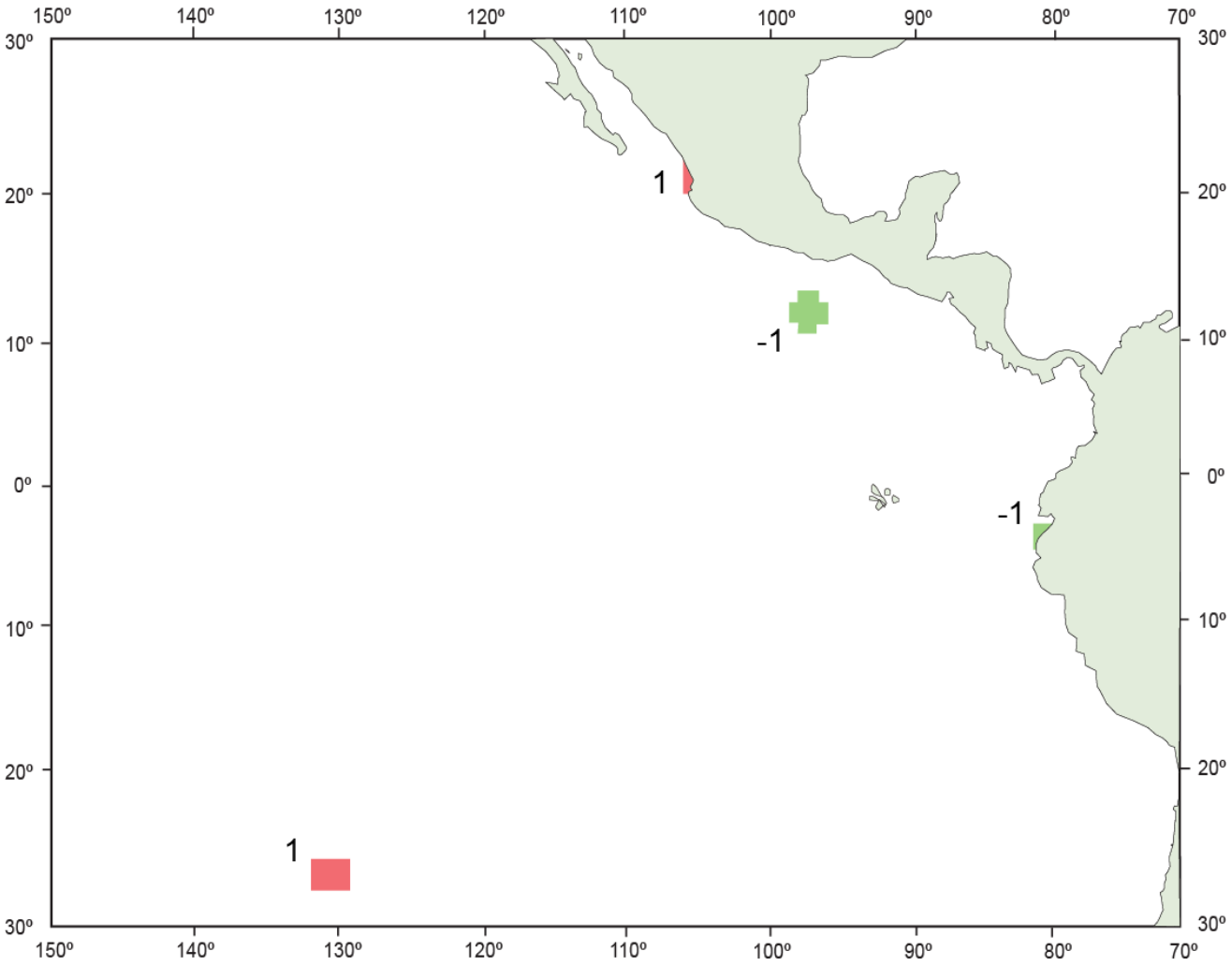

FIGURE 5. Sea-surface temperature (SST) anomalies (departures from long-term normals) for December 2013, based on data from fishing boats and other types of commercial vessels.
FIGURA 5. Anomalías (variaciones de los niveles normales a largo plazo) de la temperatura superficial del mar (TSM) en diciembre de 2013, basadas en datos tomados por barcos pesqueros y otros buques comerciales.

TABLE 1. Estimates of the numbers and capacities, in cubic meters, of purse seiners and pole-and-line vessels operating in the EPO in 2013 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 2013 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	69	22	11	102	81,753
EU (España—Spain)	PS	-	-	4	4	10,116
Guatemala	PS	-	1	-	1	1,475
México	PS	10	29	1	40	46,062
	LP	3	-	-	3	268
Nicaragua	PS	-	6	1	7	9,966
Panamá	PS	2	8	3	13	17,849
Perú	PS	2	-	-	2	599
El Salvador	PS	-	1	3	4	7,892
Venezuela	PS	-	14	1	15	20,890
Vanuatu	PS	-	1	-	1	1,360
All flags—Todas banderas	PS	87	91	24	202	
	LP	3	-	-	3	
	PS + LP	90	91	24	205	
				Capacity—Capacidad		
All flags—Todas banderas	PS	41,454	118,698	51,675	211,827	
	LP	268	-	-	268	
	PS + LP	41,722	118,698	51,675	212,095	

TABLE 2. Estimates of the retained catches of tunas in the EPO from 1 January through 31 December 2013, by species and vessel flag, in metric tons.
TABLA 2. Estimaciones de las capturas retenidas de atunes en el OPO del 1 de enero al 31 de diciembre de 2013, 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**
Colombia	17,371	21,376	1,246	-	-	-	12	-	40,005	7.3
Ecuador	27,291	167,820	32,590	-	802	-	376	1,821	230,700	41.8
México	116,804	16,190	112	3,154	1,232	-	2,558	28	140,078	25.4
Nicaragua	8,579	4,256	2,579	-	-	-	-	-	15,414	2.8
Panamá	18,500	29,977	6,179	-	-	-	30	42	54,728	9.9
Venezuela	25,988	16,724	828	-	-	-	13	23	43,576	7.9
Other—Otros[2]	7,302	13,712	6,045	-	-	-	-	13	27,072	4.9
Total	221,835	270,055	49,579	3,154	2,034	-	2,989	1,927	551,573	

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

TABLE 3. Reported catches of bigeye tuna in the EPO during 2013 by longline vessels.
TABLA 3. Capturas reportadas de atún patudo en el OPO durante 2013 por buques palangreros.

Flag	Quarter				Month			Fourth quarter	Total
	1	2	3	1-3	10	11	12		
Bandera	**Trimestre**				**Mes**			**Cuarto trimestre**	**Total**
	1	2	3	1-3	10	11	12		
China	1,279	-	-	1,279	-	-	-	-	1,279
Japan—Japón	-	-	-	-	-	-	-	-	-
Republic of Korea—República de Corea	2,791	1,656	838	5,285	459	1,275	1,303	3,037	8,322
Chinese Taipei—Taipei Chino	928	473	890	2,291	454	878	-	1,332	3,623
United States—Estados Unidos	-	-	-	-	-	-	-	-	595
Vanuatu	-	-	-	-	-	-	-	-	-
Total	4,998	2,129	1,728	8,855	913	2,153	1,303	4,369	13,819

TABLE 4. Oceanographic and meteorological data for the Pacific Ocean, January-December 2013. 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, enero-diciembre 2013. 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**	**36**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	24.0 (-0.5)	25.7 (-0.4)	26.7 (0.1)	24.7 (-0.9)	22.9 (-1.4)	21.5 (-1.4)
Area 2 (5°N-5°S, 90°-150°W	25.1 (-0.6)	25.9 (-0.5)	27.2 (0.1)	27.4 (-0.2)	26.4 (-0.7)	25.8 (-0.6)
Area 3 (5°N-5°S, 120°-170°W)	26,2 (-0.4)	26.3 (-0.4)	27.0 (-0.2)	27.7 (-0.1)	27.6 (-0.3)	27.4 (-0.2)
Area 4 (5°N-5°S, 150W°-160°E)	28.3 (0.0)	28.1 (0.0)	28.0 (-0.2)	28.5 (0.0)	28.7 (-0.1)	28.8 (-0.1)
Thermocline depth—Profundidad de la termoclina, 0°-80°W	20	20	10	10	25	25
Thermocline depth—Profundidad de la termoclina, 0°-110°W	20	25	75	55	30	60
Thermocline depth—Profundidad de la termoclina, 0°-150°W	125	130	120	120	105	130
Thermocline depth—Profundidad de la termoclina, 0°-180°	175	175	180	175	180	175
SOI—IOS	-0.1	-0.2	1.5	0.2	0.8	1.2
SOI*—IOS*	0.52	-1.89	1.52	-1.29	4.79	6.91
NOI*—ION*	6.64	8.00	2.06	2.73	1.36	1.16

TABLE 4. (continued)
TABLA 4. (continuación)

Month—Mes	**7**	**8**	**9**	**10**	**11**	**12**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	20.3 (-1.3)	19.7 (-1.0)	19.8 (-0.6)	20.2 (-0.6)	21.1 (-0.5)	22.6 (-0.2)
Area 2 (5°N-5°S, 90°-150°W	25.0 (-0.7)	24.4 (-0.6)	24.7 (-0.1)	24.7 (-0.2)	24.8 (-0.2)	25.1 (0.0)
Area 3 (5°N-5°S, 120°-170°W)	26.9 (-0,3)	26.5 (-0.3)	26.7 (-0.1)	26.4 (-0.3)	26.7 (0.0)	26.5 (0.0)
Area 4 (5°N-5°S, 150W°-160°E)	28.8 (0.0)	28.7 (0.0)	28.7 (0.0)	28.7 (0.0)	28.9 (0.3)	28.6 (0.2)
Thermocline depth—Profundidad de la termoclina, 0°-80°W	25	30	20	30	30	35
Thermocline depth—Profundidad de la termoclina, 0°-110°W	60	55	60	80	80	120
Thermocline depth—Profundidad de la termoclina, 0°-150°W	140	150	140	140	165	155
Thermocline depth—Profundidad de la termoclina, 0°-180°	170	170	160	180	180	170
SOI—IOS	0.8	0.2	0.3	-0.1	0.7	0.1
SOI*—IOS*	3.37	2.18	-0.80	-0.55	3.28	0.41
NOI*—ION*	0.47	-1.30	-0.26	0.93	0,14	4.97

TABLE 5. Preliminary data on the sampling coverage of trips of tuna purse seine vessels fishing in the EPO by the observer programs of the IATTC, Colombia, Ecuador, the European Union, Mexico, Nicaragua, Panama, Venezuela, and under the MOC described above, departing during the fourth quarter of 2013. The numbers in parentheses indicate cumulative totals for the year.
TABLA 5. Datos preliminares de la cobertura de muestreo de viajes de buques atuneros de cerco que pescaron en el OPO por los programas de observadores de la CIAT, Colombia, Ecuador, México, Nicaragua, Panamá, la Unión Europea, Venezuela y bajo el MDC descrito arriba, durante el cuarto trimestre de 2013. Los números entre paréntesis indican los totales acumulados para el año.

Flag	Trips		Class-6—Observed by program						Percent observed	
			IATTC		National		Total			
Bandera	Viajes		Clase-6—Observado por programa						Porcentaje observado	
			CIAT		Nacional		Total			
Colombia	7	(45)	3	(21)	4	(24)	7	(45)	100.0	(100)
Ecuador	57	(315)	33	(200)	24	(115)[1]	57	(315)	100.0	(100)
El Salvador	4	(18)	4	(14)	0	4[1]	4	(18)	100.0	(100)
EU – UE (ESP)	5	(27)	4	(12)	1	(15)	5	(27)	100.0	(100)
Guatemala	1	(5)	1	(5)			1	(5)	100.0	(100)
México	11	(185)	6	(90)	5	(95)	11	(185)	100.0	(100)
Nicaragua	5	(24)	2	(13)	3	(11)	5	(24)	100.0	(100)
Panamá	11	(64)	7	(31)	4	(33)	11	(64)	100.0	(100)
United States—EE.UU.	0	(1)	0	(1)			0	(1)	100.0	(100)
Venezuela	6	(59)	3	(30)	3	(29)	6	(59)	100.0	(100)
Vanuatu	0	(4)	0	(4)			0	(4)	100.0	(100)
Subtotal	107	(747)	63	(421)	44	(326)	107	(747)	100.0	(100)
Class-4—Clase-4										
Colombia	0	(1)	0	(1)			0	(1)	-[2]	-[2]
Ecuador	6	(17)	4	(12)	2	(5)	6	(17)	-[2]	-[2]
Perú	2	(2)	2	(2)			2	(2)	-[2]	-[2]
Total	115	(767)	69	(436)	46	(331)	115	(767)	100.0	(100)

[1] Includes 13 total trips sampled by observers of the WCPFC, in accordance with the MOC–Incluye 13 viajes totales muestreados por observadores del WCPFC, de acuerdo al MDC.
[2] The AIDCP does not require 100-percent sampling of Class-4 vessels.--El APICD no require que buques de clase 4 sean muestreados al 100%.