INTER-AMERICAN TROPICAL TUNA COMMMISSION
COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

QUARTERLY REPORT—INFORME TRIMESTRAL

January-March 2015—Enero-Marzo 2015

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 first quarter of 2015.

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 65th 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

Dr. Michael G. Hinton participated in an International Scientific Committee meeting of the Billfish Working Group, which was held in Honolulu, Hawaii, USA, on 12-21 January 2015. The meeting was focused on preparations for an assessment of striped marlin in the northern Pacific Ocean, which was to take place in Japan in April 2015.

Dr. Michael D. Scott participated in a Fisheries and Their Environment Science meeting in La Jolla, California, USA, on 14-15 January 2015.

Drs. Guillermo A. Compeán and Richard B. Deriso met on 20 January 2015 with Dr. Margaret Leinen, Director of Scripps Institution of Oceanography, with whom they discussed various topics related to relations between the two organizations.

Drs. Guillermo A. Compeán, Richard B. Deriso, Michael D, Scott, Alexandre M. Aires-da-Silva, Carolina Minte-Vera, and other staff members met on 21-22 January 2015 with the SCS Global Services Assessment Team to discuss the evaluation of the northeastern tropical Pacific Ocean purse-seine fishery for yellowfin and skipjack tuna regarding compliance with the Marine Stewardship Council's Principles and Criteria for sustainable fisheries management. Among other things, they discussed possible labeling of canned yellowfin tuna that had been caught in association with dolphins as a Marine Stewardship Council-certified product. (SCS stands for stands for Scientific Certification Systems, Inc.).

Dr. Mark N. Maunder gave a seminar entitled "Integrated Analysis: the Worst Thing that Happened to Fisheries Stock Assessment" in Seattle, Washington, USA, on 22 January 2015, as part of the National Oceanic and Atmospheric Administration-Northwest Fisheries Science Center Monster Seminar JAM series. Links to a pdf file of the presentation, a recording of the seminar, and the abstract are available at http://capamresearch.org/content/capam-pi-webinar-data-weighting.

Dr. Guillermo A. Compeán met with Mr. Gilles Hosch of the Food and Agriculture Organization of the United Nations on 29 January 2015 with regard to the best practices for traceability and legal provenance for Catch Documentation Scheme systems for tuna fisheries.

Dr. Martín A. Hall and Mr. Nickolas W. Vogel participated in a workshop, sponsored by the International Seafood Sustainability Foundation (ISSF), held at the National Taiwan Ocean University, Keelung, Chinese Taipei, on 27-29 January 2015. The goal of the workshop was to compare longline data collected by the various tuna regional fisheries management organizations, and to produce a document with recommendations aiming at achieving consistency among the programs, and making progress toward the collection of the data needed to standardize the longline data bases used for studies of catches and bycatches.

In addition to Dr. Hall and Mr. Vogel, representatives of the National Taiwan Ocean University, the Commission for the Conservation of Southern Bluefin Tuna, the Indian Ocean Tuna Commission, the International Commission for the Conservation of Atlantic Tunas, the Secretariat of the Pacific Community, the Western and Central Pacific Fisheries Commission, FAO's Global Environment Facility-funded Areas Beyond National Jurisdiction (ABNJ) Tuna Project, the Agreement on the Conservation of Albatrosses and Petrels, and Bird Life International participated in the workshop. The expenses of all the participants were paid by the ISSF.

Dr. Martín A. Hall and Messrs. Kurt M. Schaefer and Marlon H. Román Verdesoto participated in a workshop, organized by the International Seafood Sustainability Foundation, on non-entangling drifting fish-aggregating devices, held at the American Tuna Boat Association in San Diego, California, USA, on 16 February 2015. The meeting was attended by a small international group of tuna scientists and representatives of the tuna industry, including some fleet managers of purse-seine vessel.

Dr. Martín A. Hall and Messrs. Kurt M. Schaefer and Daniel W. Fuller participated at the fourth meeting of the Scientific Committee of the International Seafood Sustainability Foundation bycatch project, held at Bumble Bee Foods in San Diego, California, USA, on 17-20 February 2015.

Drs. Guillermo A. Compeán, Alexandre M. Aires-da-Silva, and Carolina Minte-Vera participated in a "Taller de Ordenamiento de las Pesquerías de Atún de los Estados Costeros" in Panama, R.P., on 24-25 February 2015. This workshop was part of a program called Common Oceans, under the collaboration of FAO, the World Wildlife Fund, the International Seafood Sustainability Foundation, and the IATTC. Dr. Compeán, along with Drs. Minte-Vera and Aires-da-Silva, were among the experts who supported the workshop with their knowledge and experience in tuna fisheries. According to the purpose of the project Gestión Sostenible de la Pesca de Atún y Conservación de la Biodiversidad (ABNJ-Common Oceans), this workshop was designed to provide a framework of an effective and sustainable tuna catch, plus basic knowledge on how to participate in the work of the Evaluation of Strategic Management (EEM), which the IATTC leads in the Pacific Ocean.

Dr. Guillerm A. Compeán participated in the V Extraordinary meeting of OSPESCA/SICA [Organización del Sector Peaquero y Acuicola del Centroamerica/Sistema de la Integración Centroamericana] in Guatemala City, Guatemala, on 4 March 2015. The purpose of the meeting was to reaffirm interest in strengthening the ties of friendship and collaboration among the parties to promote actions and common interest to ensure sustainable use of the fisheries resources.

Dr. Guillerm A. Compeán, as a member of "Comisión Dictaminadora Externa," participated in a meeting of the Centro de Investigaciones Biológicas del Noroeste, S.C., in La Paz, Baja California Sur, Mexico, on 9-11 March 2015.

Dr. Michael D. Scott chaired a meeting of the Pacific Scientific Review Group, held in Seattle, Washington, USA, on 13-16 March 2015. This group reviews the marine mammal scientific research and management activities of the U.S. National Marine Fisheries Service and the U.S. Fish and Wildlife Service.

Dr. Carolina Minte-Vera participated in the International Seafood Sustainability Foundation (ISSF) Stock Assessment Workshop, "Characterizing Uncertainty in Stock Assessment and Management Advice," held in Monterey, California, USA, on 16-18 March 2015. The following statement describes the purpose of the meeting:

Background

Over the last few years, tuna RFMOs [Regional Fishery Management Organizations] have been moving progressively towards the adoption of integrated harvest strategies for the management of their stocks. This progress involves improved data collection, adoption of target and limit reference points, and analyses of the performance of alternative harvest control rules through management strategy evaluations.

Quantifying uncertainty in stock status results can be very important when it comes to implementing harvest strategies. For example, if an RFMO decides on what constitutes an unacceptable level of risk of exceeding a Limit, then the methods used to quantify that probability of exceeding the limit may be highly influential.

The purpose of the 2015 ISSF Stock Assessment Workshop is to review recent progress made by the tuna RFMOs towards adopting harvest strategies, with particular emphasis on the methodologies used to quantify and express uncertainty in stock status results. Discussions will aim to highlight the pros and cons of different approaches, and recommendations for harmonization will be made where appropriate.

On 17-18 March 2015, Dr. Guillermo A. Compeán visited the headquarters of the Instituto Costarricense de Pesca y Acuacultura in San Jose, Costa Rica, where he met with two Costa Rican Commissioners, Mr. Luis Felipe Arauz (also Minister of Agriculture) and Mr. Antonio Porras.

Drs. Guillermo A. Compeán, Richard B. Deriso, Mark N. Maunder, and Alexandre M. Aires-da-Silva, and Mr. Jean-Francois Pulvenis, participated in a "Pacific Bluefin … Research Coordination Meeting" convened by the U.S. National Marine Fisheries Service in La Jolla, California, USA, on March 30, 2015. The purpose of the meeting was "to promote research awareness, identify gaps in [Pacific bluefin] tuna research, explore partnerships and build collaborations." Dr. Aires-da-Silva gave a brief presentation on commercial fisheries for bluefin and sampling of bluefin in the eastern Pacific Ocean.

DATA COLLECTION AND DATABASE PROGRAM

There are two major fisheries for tunas in the eastern Pacific Ocean (EPO; the region bounded by the coastline of the Americas, 50°N, 150ºW, and 50°S), the commercial surface fishery and the industrial 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 industrial 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 compositions 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 compositions 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 4).

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 stationed at its field offices collected 267 length-frequency samples from 183 wells and abstracted logbook information for 261 trips of commercial fishing vessels during the first quarter of 2015.

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 2015 is about 235,781 m^3 (Table 1). The average weekly at-sea capacity for the fleet, for the weeks ending 1 January through 29 March, was about 149,000 m^3 (range: 51,500 to 187,200 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-March 2015, and comparative statistics for 2010-2014, were:

Species	2015	2010-2014			Weekly average, 2015
		Average	Minimum	Maximum	
Yellowfin	63,300	60,300	51,800	66,900	4,900
Skipjack	92,800	64,600	50,800	78,600	7,100
Bigeye	12,400	9,600	8,200	12,200	1,000

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

Catch statistics for 2014

Estimates of the annual retained and discarded EPO catches of the various species of tunas and other fishes by purse seiners and pole-and-line vessels from 1985-2014 are shown in Table 3. The retained catch data for skipjack and bluefin are essentially complete except for insignificant catches made by the longline, recreational (for skipjack), and artisanal fisheries. The catch data for yellowfin and bigeye do not include catches by longline vessels, as the data for these fisheries are received much later than those for the surface fisheries. About 3 to 12 percent of the total catch of yellowfin is taken by longliners. Until about the mid-1990s, the great majority of the catch of bigeye had been harvested by the longline fishery.

The regulations for surface fishing in 2014 applied only to Class-4, -5, and -6 purse seiners (vessels with fishing-carrying capacities greater than 181 metric tons). All such vessels registered in a nation or other fishing entity were required to cease fishing during one of the following periods:

Period 1	Period 2
29 July 2014-28 September 2014	18 November 2014-18 January 2015

(The owner of each vessel was entitled to select the period during which that vessel would refrain from fishing.) Notwithstanding the above, any Class-4 vessel (vessel with a fish-carrying capacity of 182-272 metric tons), provided it had an observer aboard, could make one trip of not more than 30 days during the closed period that its owner had selected. Also, the area bounded by 4°N, 3°S, 96°W, and 110°W was closed to fishing by purse-seine vessels from 29 September through 29 October 2014. In addition, the following limits on the catches of bigeye tuna were imposed on longline vessels of four Far East nations: China, 2,507 metric tons (t); Japan, 32,372 t; Republic of Korea, 11,947 t; Chinese Taipei, 7,555 t.

Preliminary estimates of the retained catches, in metric tons, of yellowfin, skipjack, and bigeye in the EPO during 2014, and final estimates of the 1999-2013 annual averages of those species, based on the methods described at the beginning of this section, are as follows:

Species	2014	Average	Minimum	Maximum
			1999-2013	
Yellowfin	233,000	260,000	167,000	413,000
Skipjack	262,000	234,000	144,000	297,000
Bigeye	60,000	65,000	49,000	95,000

The 2014 catch of yellowfin was about 27 thousand t (10 percent) less than the average for 1999-2013. The 2014 skipjack catch was about 28 thousand t (12 percent) greater than the average for 1999-2013 The 2014 bigeye catch was about 6 thousand t (9 percent) less than the average for 1999-2013.

The average annual distributions of the purse-seine catches of yellowfin, skipjack, and bigeye, by set type, in the EPO during 2009-2013 are shown in Figures 1a, 2a, and 3a, and preliminary estimates for 2014 are shown in Figures 1b, 2b, and 3b.

The majority of the yellowfin catches in 2014 were taken in sets associated with dolphins from 3 general areas: between 5°N and 15°N west of 115°W longitude, north of 15°N and east of 115°W longitude, and between 5°N and 15°N east of 105°W longitude. Offshore catches of yellowfin in association with dolphins were found further south than in the previous year.

Yellowfin catches on unassociated schools in 2014 decreased by 27% from the previous year, mainly due to a substantial decrease in catch in the inshore areas off southern Mexico. Inshore catches around the equator were lower than the 2009-2013 average. Smaller amounts of yellowfin were caught south of the equator throughout the EPO, mostly in association with floating objects.

Inshore skipjack catches in 2014 were similar to those of previous years, though the percentage of catch in association with floating objects increased. Offshore catches of skipjack were almost exclusively in association with floating objects, and the overall 2014 offshore catches decreased from the previous year.

Bigeye are not often caught north of about 7°N, and the catches of bigeye have decreased in the inshore areas off South America for several years. With the development of the fishery for tunas associated with FADs, the relative importance of the inshore areas has decreased, while that of the offshore areas has increased. Most of the bigeye catches are taken in sets on FADs between 5°N and 5°S.

While yellowfin, skipjack, and bigeye tunas comprise the most significant portion of the retained catches of the purse-seine and pole-and-line fleets in the EPO, other tunas and tuna-like species, such as black skipjack, bonito, wahoo, and frigate and bullet tunas, contribute to the overall harvest in this area. The total retained catch of those other species by these fisheries was about 7.0 thousand t in 2014, which is slightly greater than the 1999-2013 annual average retained catch of about 6.4 thousand t (range: 500 to 19 thousand t).

Preliminary estimates of the retained catches in the EPO in 2014, by flag, and by country, are given in Table 4.

Preliminary estimates of the most significant (equal to or greater than about 5 percent of the total) retained catches, of all species combined, during 2014 were as follows:

Flag	Retained catches	
	Metric tons	Percentage
Ecuador	251,300	45
Mexico	139,100	24
Panama	49,600	9
Colombia	42,400	8
Venezuela	38,000	7

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

There are no adjustments included for factors, such as type of set or vessel operating costs and market prices that 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 363 metric tons), 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 capacity.

The estimated nominal catches per day of fishing for yellowfin, skipjack, and bigeye in the EPO during the fourth quarter of 2014 and comparable statistics for 2009-2013 are:

Region	Species	Gear	2014	2009-2013		
				Average	Minimum	Maximum
N of 5° N	Yellowfin	PS	14.1	12.4	11.1	13.4
S of 5° N			2.5	2.7	2.4	3.2
N of 5° N	Skipjack	PS	1.4	2.1	1.1	3.0
S of 5° N			9.8	9.5	8.1	11.4
EPO	Bigeye	PS	2.1	2.4	2.2	2.6
EPO	Yellowfin	LP	2.7	5.2	2.9	9.2
EPO	Skipjack	LP	0.5	0.9	0.5	1.8

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-13-01 Tuna conservation 2014-2016). The catches that have been reported for January-December 2014 are shown in Table 5a, and preliminary estimates of those reported for the first quarter of 2015 are shown in Table 5b.

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, 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 fourth quarter of 2009-2014 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 fourth quarter of 2014, and the second shows data for the combined strata for the fourth quarter of each year of the 2009-2014 period. Samples were obtained from 156 wells that contained fish caught during the fourth quarter of 2014.

There are ten surface fisheries for yellowfin defined for stock assessments: four associated with floating objects, two with unassociated schools, three associated with dolphins, and one pole-and-line (Figure 4). The last fishery includes all 13 sampling areas. Of the 156 wells sampled that contained fish caught during the fourth quarter of 2014, 111 contained yellowfin. The estimated size compositions of these fish are shown in Figure 5a. The majority of the yellowfin catch during the fourth quarter was taken by sets on dolphins in the Northern, Inshore and Southern areas. Lesser amounts of small yellowfin were also taken in the Ecuatorial and Inshore floating-object area, with lesser amounts of large yellowfin catch in the Southern unassociated area.

The estimated size compositions of the yellowfin caught by all fisheries combined during the fourth quarters of 2009-2014 are shown in Figure 5b. The average weight of the yellowfin caught during the fourth quarter of 2014 (10.8 kg) was consistent with the average weight of the previous 2 years, and in the middle of the 5 year range with a low of 6.1 kg in 2010 and high of 15.2 kg in 2011. The size distribution of yellowfin in 2014 tended toward a modest increase in larger tuna in the 130- to 150-cm range.

There are eight fisheries for skipjack defined for stock assessments: four associated with floating objects, two with unassociated schools, one associated with dolphins, and one pole-and-line (Figure 4). The last two fisheries include all 13 sampling areas. Of the 156 wells sampled that contained fish caught during the fourth quarter of 2014, 105 contained skipjack. The estimated size compositions of these fish are shown in Figure 6a. The majority of the skipjack was caught in the Ecuatorial floating-object area, with catch in the 40- to 70-cm range. The smallest size skipjack in the 30- to 50-cm range was caught in the Southern floating-object area, while primarily larger size skipjack in the 60- to 70-cm range was caught in the Southern unassociated area. Lesser amounts of skipjack were also caught in the Northern and Inshore floating-object fisheries.

The estimated size compositions of the skipjack caught by all fisheries combined during the fourth quarters of 2009-2014 are shown in Figure 6b. The average weight of the skipjack caught during the fourth quarter of 2014 (2.4 kg) was less than the average weight of 2013 (3.0 kg), but the same as that of 2012. The highest average weight for the fourth quarters of 2009-2014was 3.6 kg in 2011, and the lowest was 1.7 kg in 2010.

There are seven surface fisheries for bigeye defined for stock assessments: four associated with floating objects, one with unassociated schools, one associated with dolphins, and one pole-and-line (Figure 4). The last three fisheries include all 13 sampling areas. Of the 156 wells sampled that contained fish caught during the fourth quarter of 2014, 32 contained bigeye. The estimated size compositions of these fish are shown in Figure 7a. Nearly all of the catch was taken in floating-object sets, primarily in the Northern, Equatorial, and Southern areas. The catch was fairly evenly distributed from about 30- to 125-cm.

The estimated size compositions of the bigeye caught by all fisheries combined during the fourth quarter of 2009-2014 are shown in Figure 7b. The average weight of bigeye caught during the fourth quarter of 2014 (5.4 kg) was less than the average weight in the previous year (6.3 kg) as well as the average of 2011 (7.3 kg), which was the greatest of the 2008-2012 period. The bigeye size distribution during the fourth quarter of 2014 was very similar to that of the previous year.

The estimated retained purse-seine catch of bigeye less than 60 cm in length during the fourth quarter of 2014 was 4,200 t, or about 26 percent of the estimated total retained purse-seine catch of bigeye during that period. The corresponding amounts for 2009-2013 ranged from 1,400 to 5,300 t, or 15 to 31 percent respectively. 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 except on January 26, February 14-19 and 23, and March 10. Spawning occurred between 2:40 p.m. and midnight. The number of eggs collected ranged from 3,000 to 653,000 per day. The water temperatures in the tank ranged from 23.5° to 28.1°C.

At the end of the quarter there were seven 43- to 53-kg, seven 33- to 34-kg, and eight 6- to 19-kg yellowfin in Tank 1. Eleven 3- to 15-kg yellowfin tuna in the 170,000-L reserve broodstock tank (Tank 2) were transferred to Tank 1 during the quarter. Tank 2 remained empty for cleaning and maintenance for the remainder of the quarter.

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, and hatching rate. The lengths of hatched larvae, duration of yolk-sac stage, 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 (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).

Ms. Michiko Kawahito, the JICA SATREPS project counterpart stationed at the Achotines Laboratory since May 2014, resigned for personal reasons and returned to Japan on 16 January 2015. JICA is planning to assign a replacement counterpart by May 2015.

The Japanese Ambassador to Panama, Hiroaki Isobe, visited the Achotines Laboratory on 25 March 2015. He was accompanied by cultural and political officer Ryotaro Kasai and the Director and one staff member of the JICA office in Panama. It was Ambassador Isobe's first visit to the Achotines Laboratory. The primary purpose of his visit was to review activities and progress of the SATREPS project.

Collaborative studies of yellowfin eggs and larvae

Cryoocyte, Inc., a research and technology company based in Boston, Massachusetts, USA, is collaborating with the Early Life History group on some pilot studies on the feasibility of cryopreservation techniques for yellowfin embryo stages. Cryoocyte scientists initiated research studies at the Achotines Laboratory in May 2014 and returned to continue additional trials in mid-December 2014. The trials were completed on January 17, 2015, and further research is planned for mid-2015. Cryoocyte is providing the funding for the pilot research trials.

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 March 2015, a large group of fish continued to be held in the broodstock snapper tank.

Visitors at the Achotines Laboratory

Mgtr. Ivan Eduardo Flores Morales, the newly-appointed Administrator General of ARAP, visited the Achotines Laboratory on 26 February 2015. He was accompanied on his tour of the Achotines Laboratory by local and executive-level ARAP staff members.

From 26 to 27 February, 2015, IATTC staff members Dr. Alexandre Aires-da Silva and Messrs. Ricardo Lopez and Salvador Siu joined Mr. Benito Sarmiento of Baja Aquafarms for a visit to the Achotines Laboratory. During their stay, they were given a detailed tour of the Laboratory. They also discussed mariculture research with tunas and potential linkage between the research carried out by the IATTC's Early Life History group and stock assessment and population dynamics.

Mss. Nora Roa-Wade and Teresa Musano spent the period of 2-4 March 2015 at the Achotines Laboratory, where they reviewed accounting procedures and other administrative matters with Mr. Vernon P. Scholey and Achotines Laboratory Administrative Assistant Ruth Castillo.

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). (The depth of the thermocline is a proxy for the depth of the upper edge of the oxygen-minimum zone, a thick layer of oxygen-poor water underlying the upper mixed layer. In locations where the thermocline is shallow, the habitat for tunas, especially yellowfin tuna, is vertically compressed near the surface of the ocean, where they are vulnerable to capture by surface gear.) In addition, the Southern Oscillation Indices (SOIs) are negative during El Niño episodes. (The SOI is the difference between the anomalies of sea-level atmospheric pressure at Tahiti, French Polynesia, and Darwin, Australia. It is a measure of the strength of the easterly surface winds, especially in the tropical Pacific in the Southern Hemisphere.) Anti-El Niño events, which are the opposite of El Niño events, are characterized by stronger-than-normal easterly surface winds, below-normal SSTs and sea levels, shallower-than-normal thermoclines, and positive SOIs. Two additional indices, the NOI* (Progress Ocean., 53 (2-4): 115-139) and the SOI*, have recently been devised. The NOI* is the difference between the anomalies of sea-level atmospheric pressure at the North Pacific High (35°N-130°W) and Darwin, Australia, and the SOI* is the difference between the anomalies of sea-level atmospheric pressure at the South Pacific High (30°S-95°W) and Darwin. Ordinarily, the NOI* and SOI* values are both negative during El Niño events and positive during anti-El Niño events.

During January 2014, the SSTs were very close to normal throughout the entire tropical EPO. In February, however, a band of cool water, which extended along the equator from the coast of South America to about 145°W, appeared. Also some spots of warm water appeared off Mexico and Central America. The band of cool water along the equator nearly disappeared in March, but there were spots of cool water along the coasts of Ecuador and Peru, and the spots of warm water off Mexico and Central America were more pronounced than they had been in February. By April the band of cool water along the equator had disappeared, but the spots of cool water along the coast of South America persisted. By May, however, the spots of cool water off South America had virtually disappeared. In May and June there was a band of warm water along the equator that extended from the coast of South America to west of 180° and the area of warm water off Mexico was still in existence (IATTC Quarterly Report for April-June 2014, Figure 5). In May, June, and July there was a band of cool water along 10°S that extended from the coast of South America to about 125°W. This band weakened during August and September (IATTC Quarterly Report for July-September 2014: Figure 5), but it persisted, and strengthened during December (IATTC Quarterly Report for October-December 2014: Figure 5). Meanwhile, extensive areas of warm water were developing north of about 10°S (IATTC Quarterly Report for July-September 2014: Figure 5)—the early onset of the El Niño event that had been predicted by the U.S. National Weather Service (IATTC Quarterly Report for January-March 2014). During October, November, and December, however, the warm water was confined mostly to the area north of the equator and, in fact, a small area of cool water appeared well south of the equator and grew larger in November and December (IATTC Quarterly Report for October-December 2014: Figure 5). By January 2015 the area of warm water off Mexico had expanded to the southwest, combining with an area of warm water along the equator west of 150°W that persisted through March (Figure 8). The SSTs had been mostly below normal from October 2013 through March 2014, but during April 2014 through March 2015 they were virtually all above normal (Table 6).

According to the Climate Diagnostics Bulletin of the U.S. National Weather Service for March 2015, "Compared to last month, more models predict El Niño (3-month values of the Niño-3.4 index [Area 3 in Table 6] equal to or greater than 0.5°C) to continue throughout 2015 …. These forecasts are supported by the increase in subsurface temperatures, enhanced convection over the Date Line, and the increased persistence of low-level westerly wind anomalies. However, model forecast skill tends to be lower during the Northern Hemisphere spring, which limits the forecast probabilities of El Niño through the year. At this time, there is also considerable uncertainty as to how strong this event may become. In summary, there is an approximately 70% chance that El Niño will continue through the Northern Hemisphere summer 2015, and a greater than 60% chance that it will last through autumn."

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 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 such 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 2014 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 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 four trips of vessels planning to operate in both areas during the first quarter of 2014. These requests were granted.

Observers from the IDCP On-Board Observer Program departed on 239 fishing trips aboard purse seiners covered by that program during the first quarter of 2014. Preliminary coverage data for these vessels during the quarter are shown in Table 7.

Training

There were no observer training sessions held during the first quarter of 2015.

Gear project

There were no dolphin safety-gear inspections and safety-panel alignment procedures carried out aboard purse seiners during the first quarter of 2015.

INTER-AGENCY COOPERATION

Dr. Martín A. Hall, a former member of the Seafood Watch Technical Advisory Committee of the Monterey Bay Aquarium, was re-appointed to that committee on 1 January 2015. The next meeting of that committee will take place in April 2015.

Drs. Martín A. Hall of the IATTC staff and Jefferson Murua of AZTI-Tecnalia and the International Seafood Sustainability Foundation gave two seminars on minimization of bycatches for tuna fishermen and other industry representatives, the first in Manzanillo, Mexico, on 12 January 2015, for 34 attendees, and the second in Mazatlán on, Mexico, on 14 January 2015 for 118 attendees. (AZTI-Tecnalia, located in northern Spain, is a non-profit private foundation committed to the social and economic development of the marine environment and food sector.)

Dr. Mark N. Maunder spent the period of 19-23 January 2013 in Seattle, Washington, USA, where he worked with Drs. James Thorson of the U.S. National Marine Fisheries Service's Northwest Fisheries Science Center and Kai Mikihiko of the National Research Institute of Far Seas Fisheries, Japan, on developing geostatistical models, using Template Model Builder to develop indices of abundance from catch-per-unit-of-effort data.

On 11 March 2015, Drs. Alexandre Aires-da-Silva and Daniel Marguiles, Messrs. Daniel W. Fuller, Marlon Román Verdesoto, and Kurt M. Schaefer, and Mss. Maria S. Stein, and Jeanne B. Wexler visited Baja Aqua Farms, one of the bluefin tuna ranching companies operating in Ensenada, Baja California, Mexico. Their activities included a boat trip to several pens and a visit to the Baja Aqua Farms facilities. Staff members of Baja Aqua Farms gave a presentation on the operation of the company and the bluefin data collected. There were discussions with IATTC staff members about the potential for collaborative work and access to detailed information on catches and size composition data collected by the company.

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VISITING SCIENTISTS

Dr. Jiang Feng Zhu of the College of Marine Sciences, Shanghai Ocean University, Shanghai, China, began a one-year stay at the IATTC headquarters in La Jolla on 5 January 2015. He is working with Drs. Mark N. Maunder and Alexandre M. Aires-da-Silva on stock assessment methodology and applications.

Ms. María Teresa Carreón Zapiain spent the period of 15 January-20 February 2015 at the IATTC headquarters in La Jolla, California, USA, where she worked with Dr. Guillermo A. Compeán on management of fisheries for sharks.

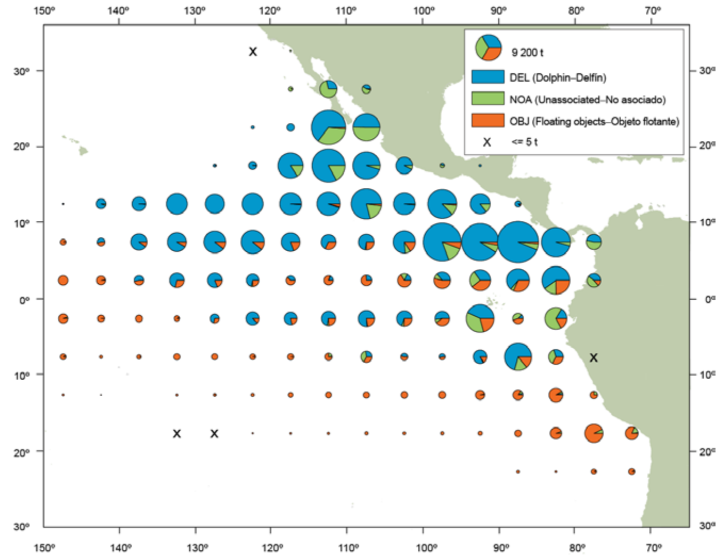

FIGURE 1a. Average annual distributions of the purse-seine catches of yellowfin, by set type, 2009-2013. The sizes of the circles are proportional to the amounts of yellowfin caught in those 5° by 5° areas.
FIGURA 1a. Distribución media anual de las capturas cerqueras de aleta amarilla, por tipo de lance,2009-2013. El tamaño de cada círculo es proporcional a la cantidad de aleta amarilla capturado en lacuadrícula de 5° x 5° correspondiente.

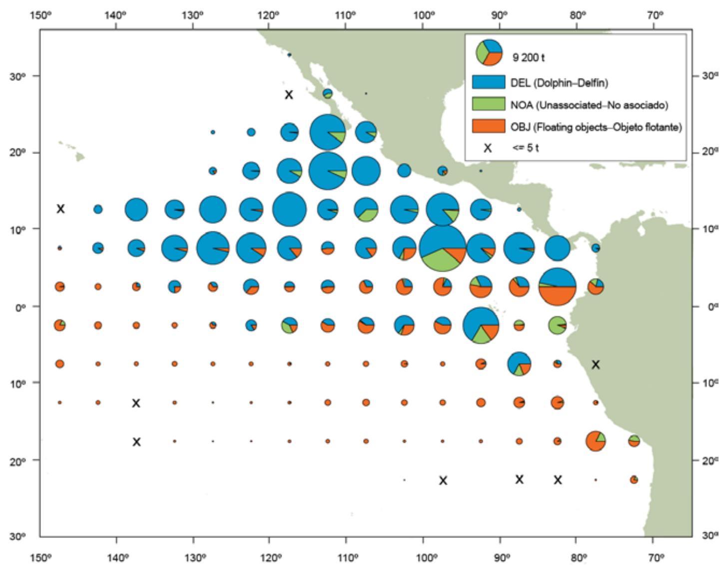

FIGURE 1b. Annual distributions of the purse-seine catches of yellowfin, by set type, 2014. The sizes of the circles are proportional to the amounts of skipjack caught in those 5° by 5° areas.
FIGURA 1b. Distribución anual de las capturas cerqueras de aleta amarilla, por tipo de lance, 2014. El tamaño de cada círculo es proporcional a la cantidad de barrilete capturado en la cuadrícula de 5° x 5° correspondiente.

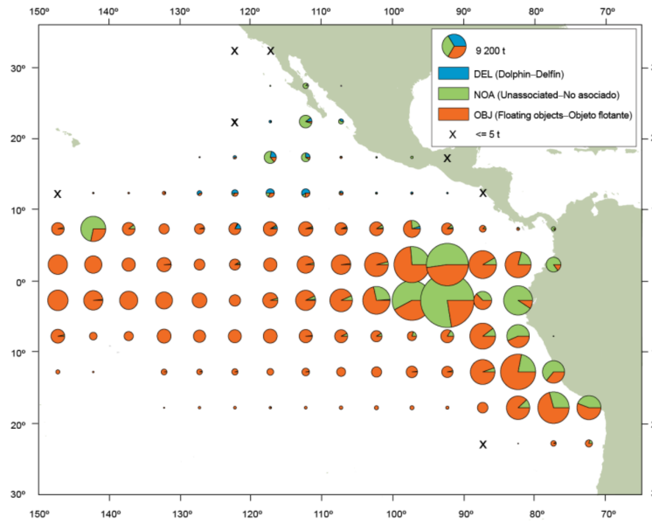

FIGURE 2a. Average annual distributions of the purse-seine catches of skipjack, by set type, 2009-2013. The sizes of the circles are proportional to the amounts of skipjack caught in those 5° by 5° areas

FIGURA 2a. Distribución media anual de las capturas cerqueras de barrilete, por tipo de lance, 2009-2013. El tamaño de cada círculo es proporcional a la cantidad de barrilete capturado en la cuadrícula de 5° x 5° correspondiente.

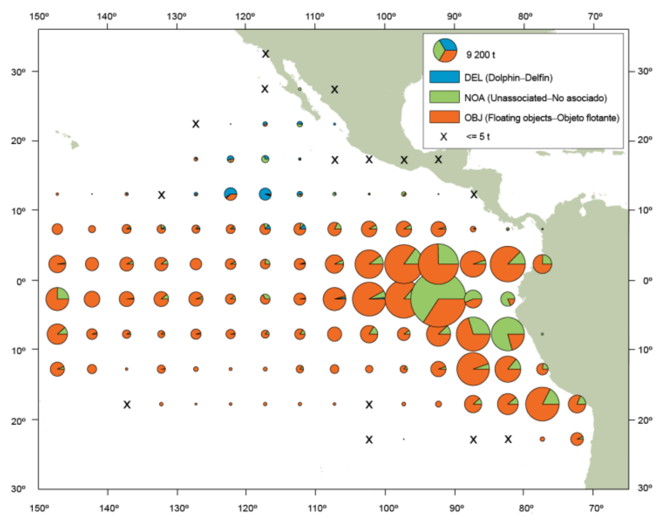

FIGURE 2b. Annual distributions of the purse-seine catches of skipjack, by set type, 2014. The sizes of the circles are proportional to the amounts of skipjack caught in those 5° by 5° areas.

FIGURA 2b. Distribución anual de las capturas cerqueras de barrilete, por tipo de lance, 2014. El tamaño de cada círculo es proporcional a la cantidad de barrilete capturado en la cuadrícula de 5° x 5° correspondiente

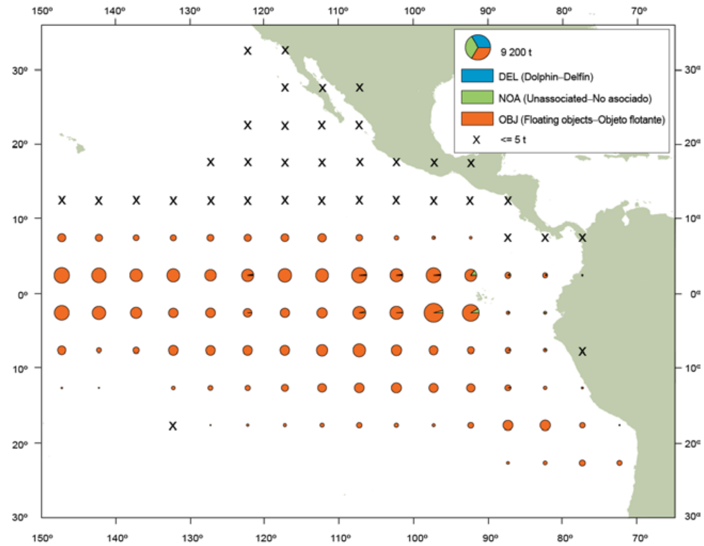

FIGURE 3a. Average annual distributions of the purse-seine catches of bigeye, by set type, 2009-2013. The sizes of the circles are proportional to the amounts of bigeye caught in those 5° by 5° areas.
FIGURA 3a. Distribución media anual de las capturas cerqueras de patudo, por tipo de lance, 2009-2013. El tamaño de cada círculo es proporcional a la cantidad de patudo capturado en la cuadrícula de 5° x 5° correspondiente

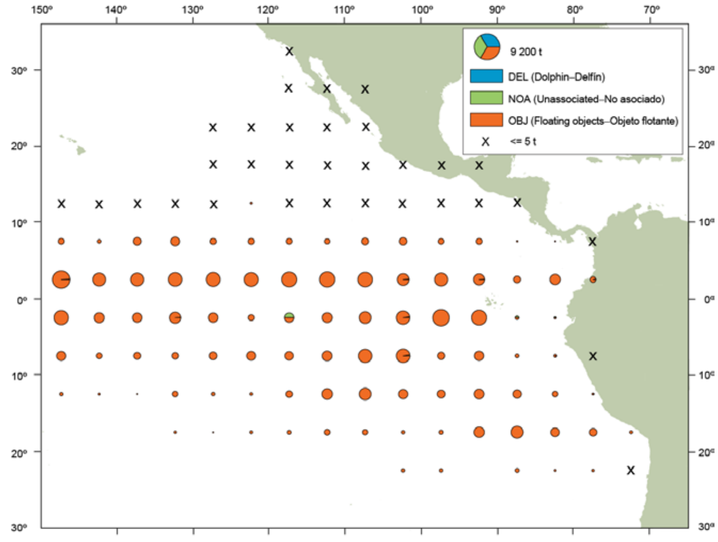

FIGURE 3b. Annual distributions of the purse-seine catches of bigeye, by set type, 2014. The sizes of the circles are proportional to the amounts of bigeye caught in those 5° by 5° areas.
FIGURA 3b. Distribución anual de las capturas cerqueras de patudo, por tipo de lance, 2014. El tamaño de cada círculo es proporcional a la cantidad de patudo capturado en la cuadrícula de 5° x 5°

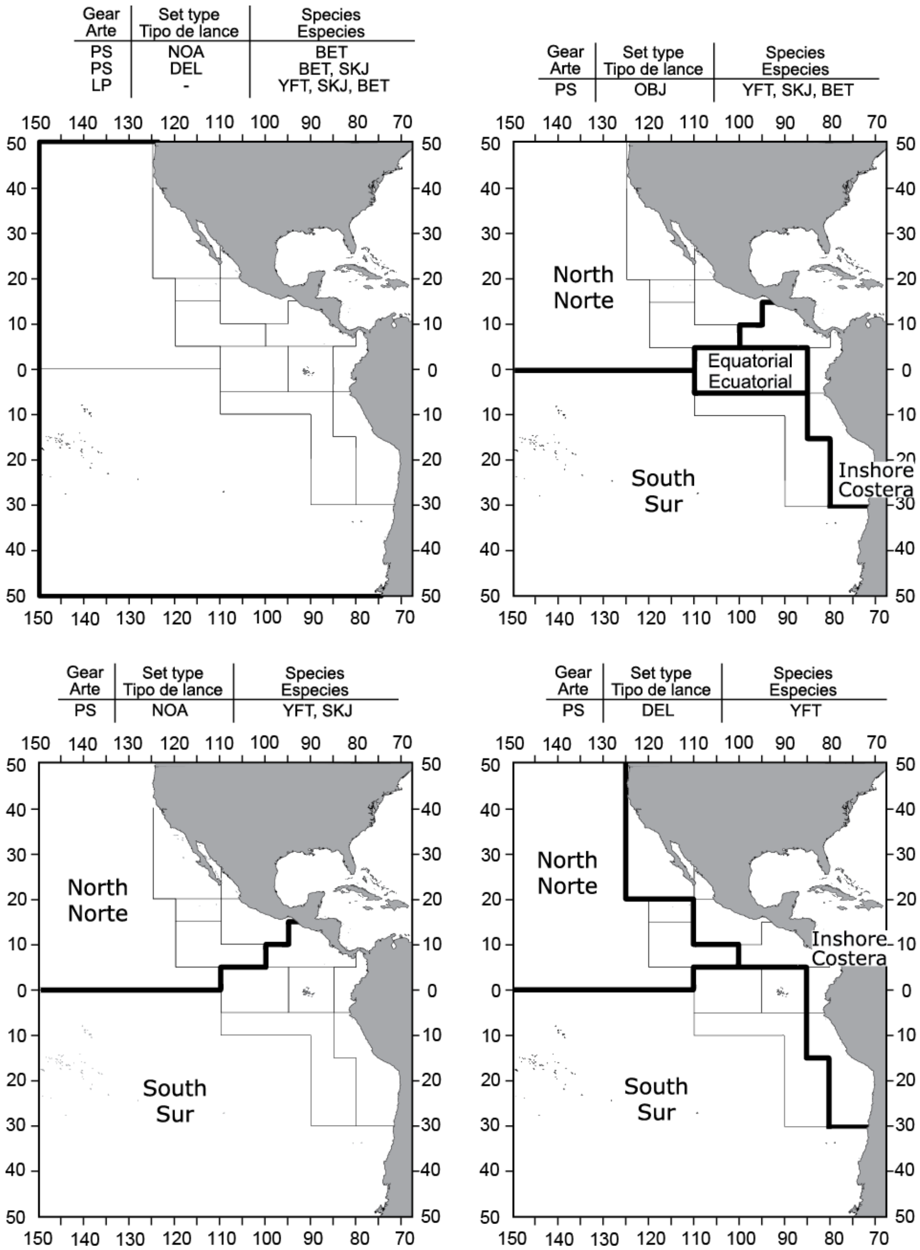

FIGURE 4. Spatial extents of the fisheries defined by the IATTC staff for stock assessment of yellowfin, skipjack, and bigeye in the EPO. The thin lines indicate the boundaries of the 13 length-frequency sampling areas, and the bold lines the boundaries of the fisheries. Gear: PS = purse seine, LP = pole and line; Set type: NOA = unassociated, DEL = dolphin, OBJ = floating object; Species: YFT = yellowfin, SKJ = skipjack, BET = bigeye.

FIGURA 4. 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.

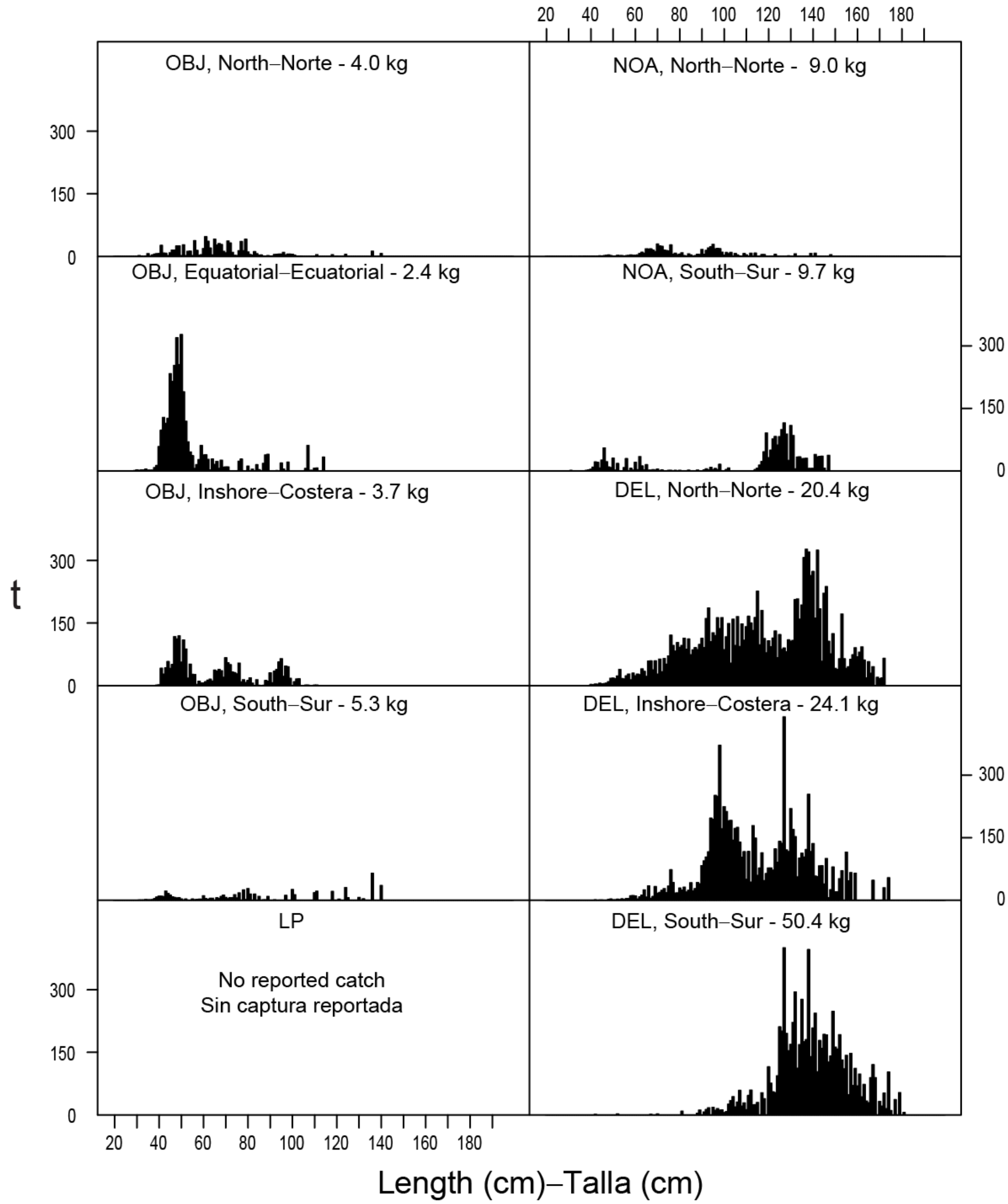

FIGURE 5a. Estimated size compositions of the yellowfin caught in each fishery of the EPO during the fourth quarter of 2014. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 5a. Composición por tallas estimada para el aleta amarilla capturado en cada pesquería del OPO durante el cuarto trimestre de 2014. 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.

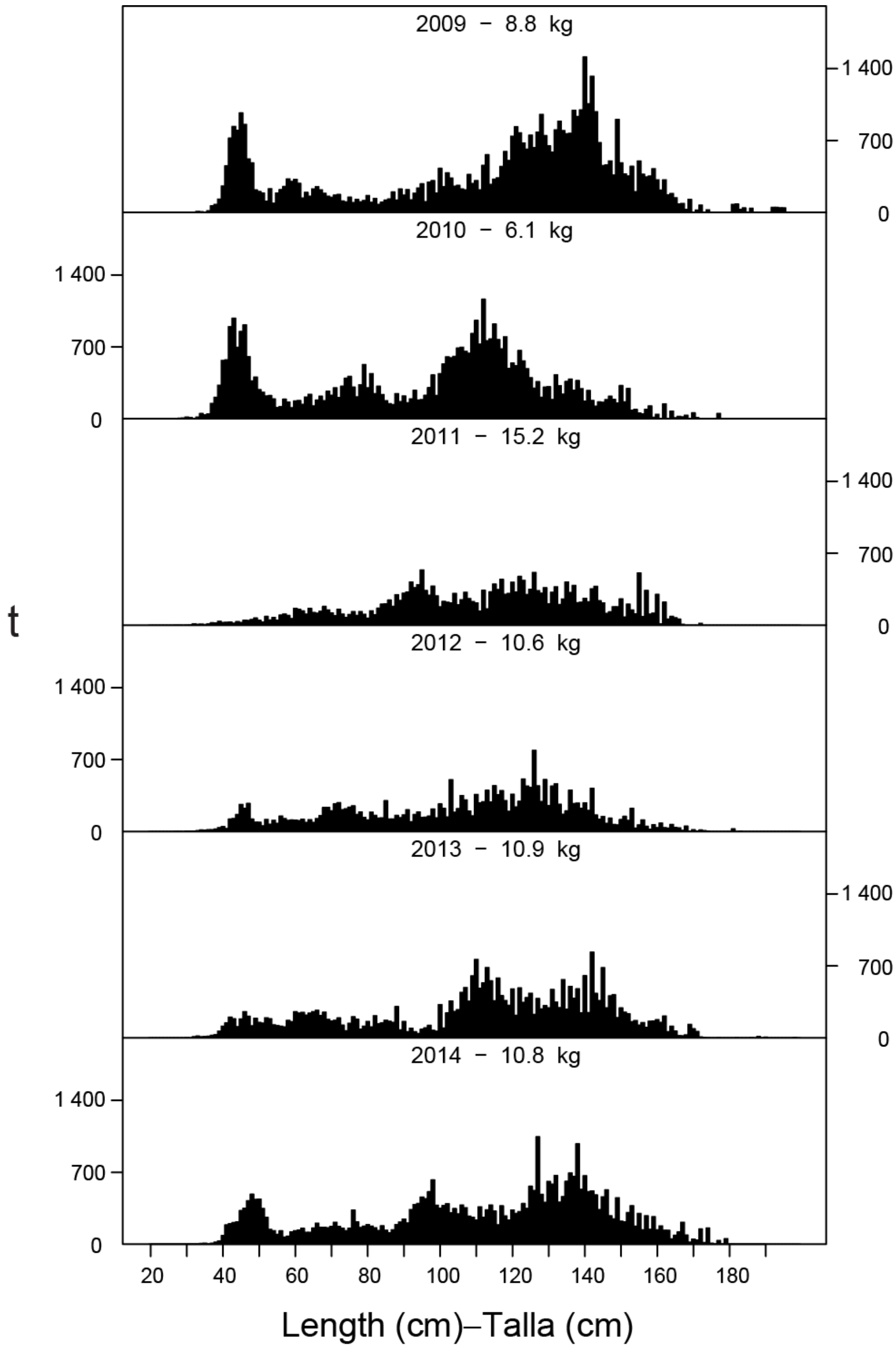

FIGURE 5b. Estimated size compositions of the yellowfin caught in the EPO during the fourth quarter of 2009-2014. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 5b. Composición por tallas estimada para el aleta amarilla capturado en el OPO en el cuarto trimestre de 2009-2014. En cada recuadro se detalla el peso promedio de los peces en las muestras; t = toneladas métricas.

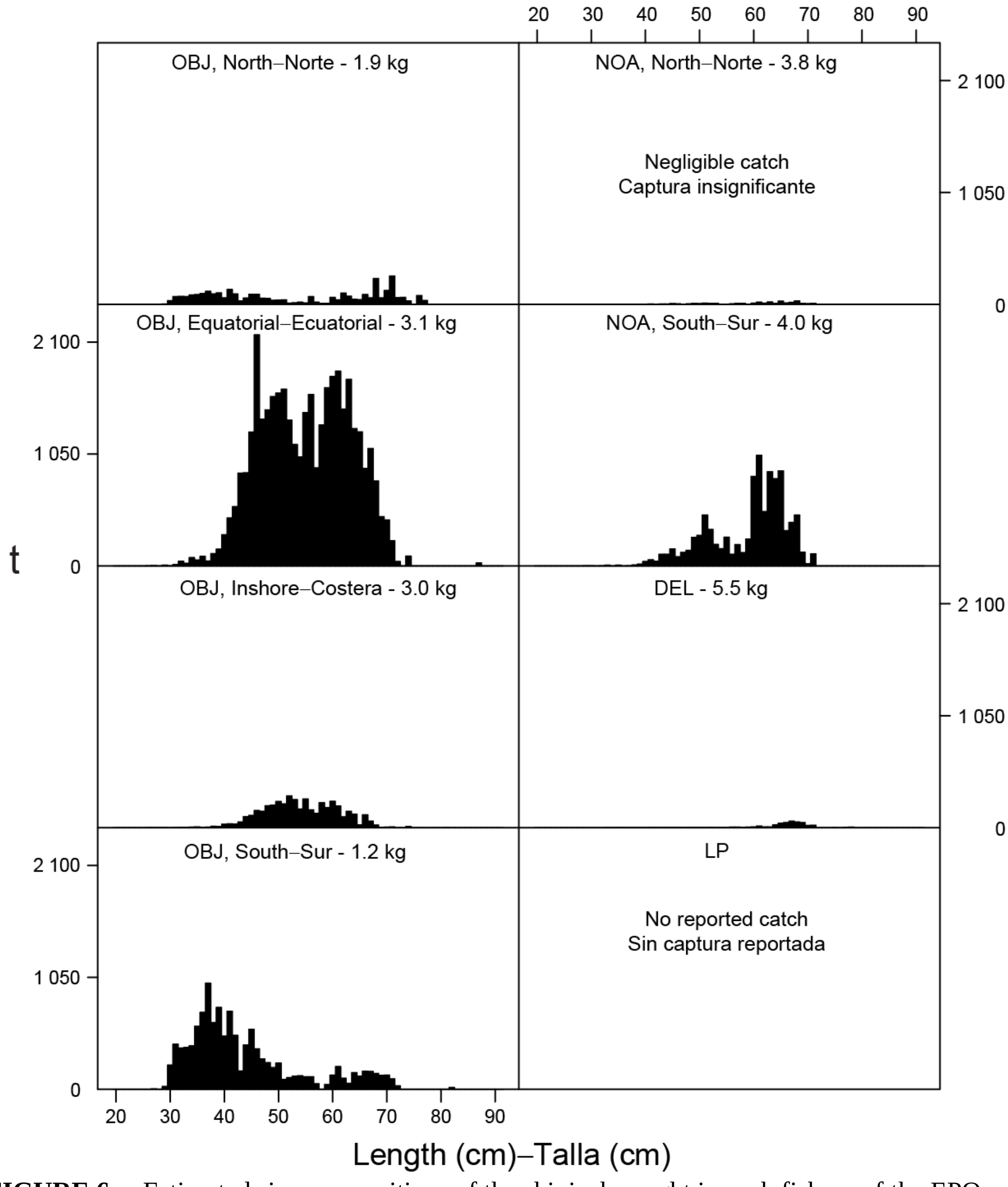

FIGURE 6a. Estimated size compositions of the skipjack caught in each fishery of the EPO during the fourth quarter of 2014. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 6a. Composición por tallas estimada para el barrilete capturado en cada pesquería del OPO durante el cuarto trimestre de 2014. 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.

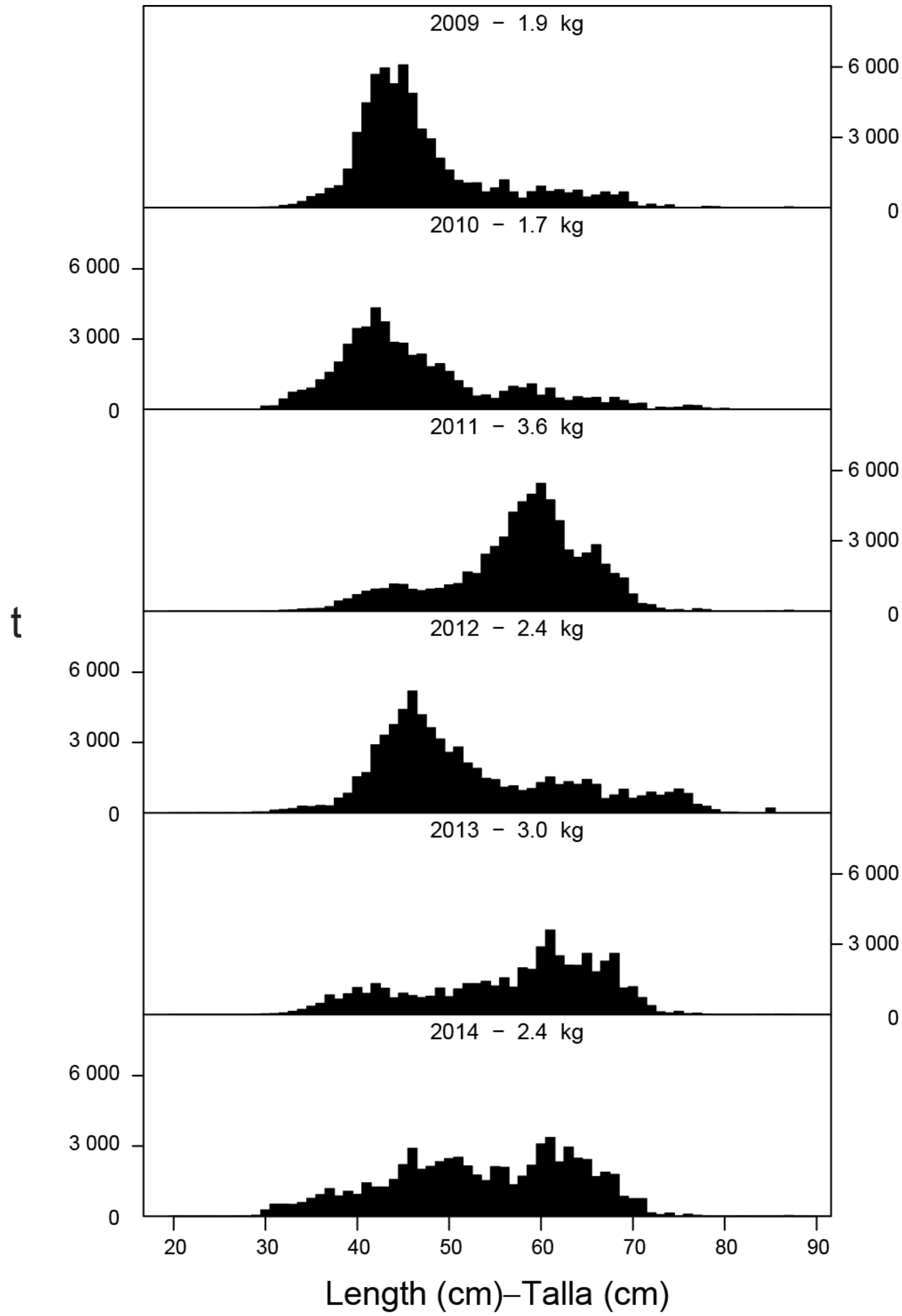

FIGURE 6b. Estimated size compositions of the skipjack caught in the EPO during the fourth quarter of 2009-2014. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 6b. Composición por tallas estimada para el barrilete capturado en el OPO en el cuarto trimestre de 2009-2014. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas.

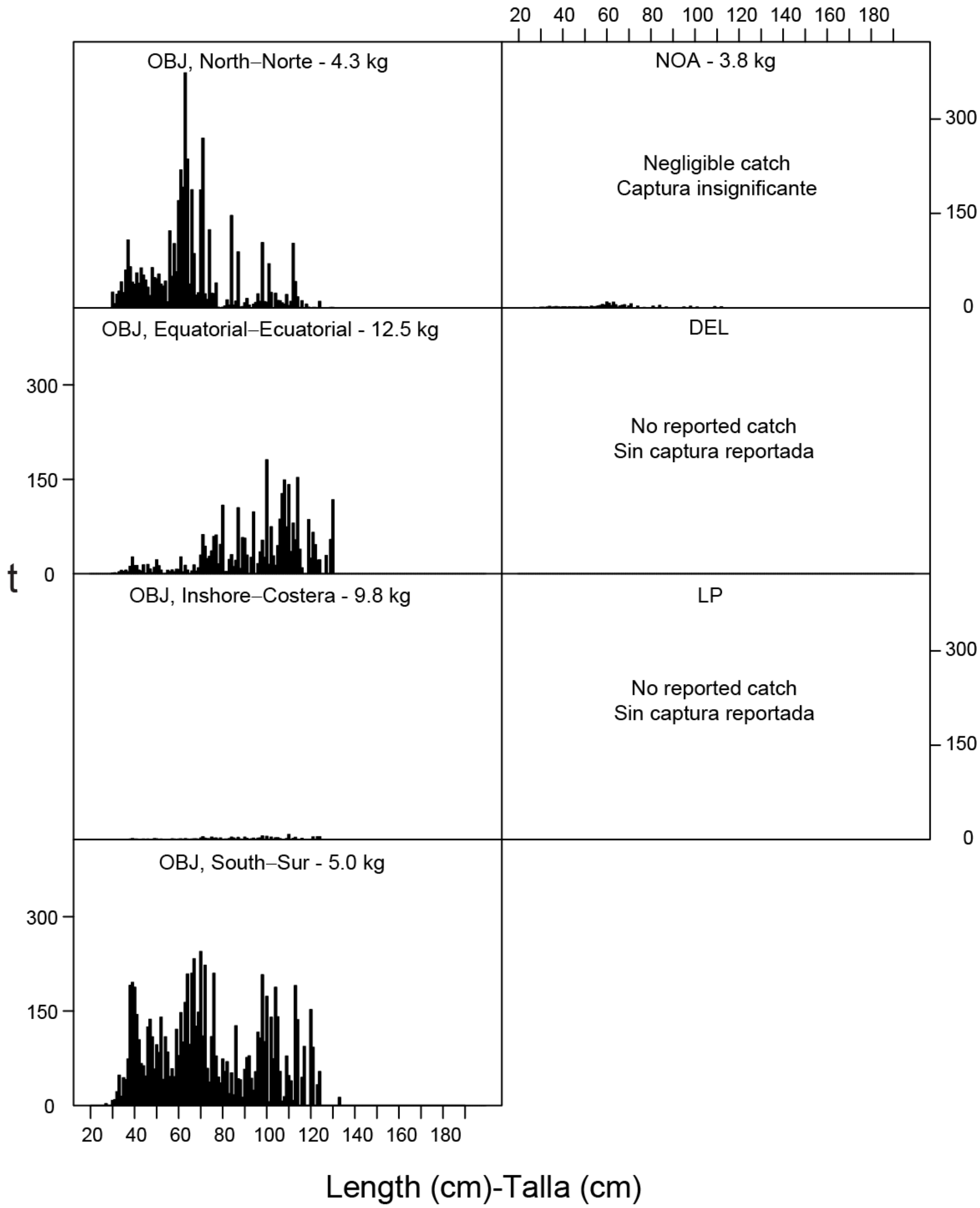

FIGURE 7a. Estimated size compositions of the bigeye caught in each fishery of the EPO during the fourth quarter of 2014. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 7a. Composición por tallas estimada para el patudo capturado en cada pesquería del OPO durante el cuarto trimestre de 2014. 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.

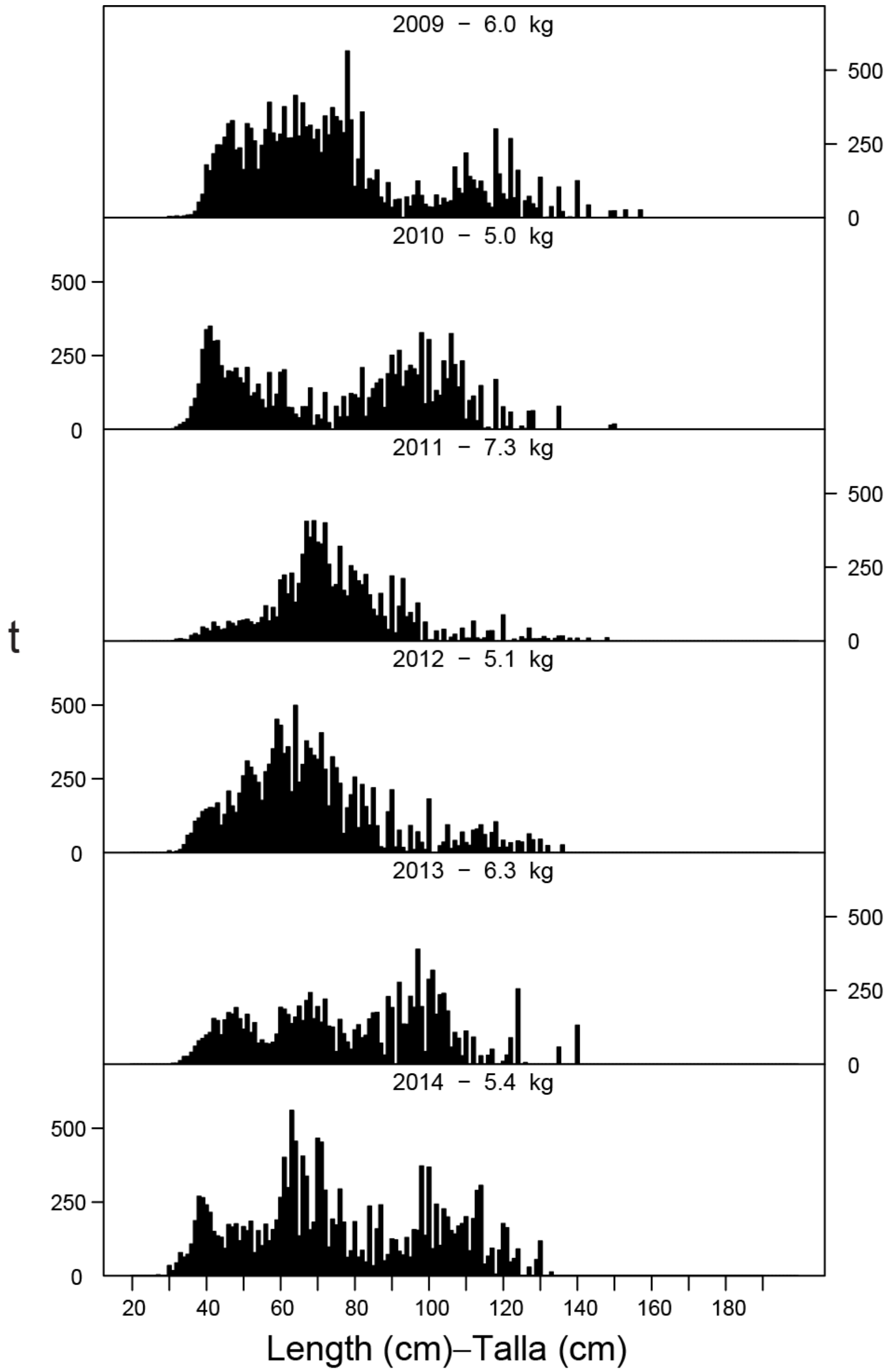

FIGURE 7b. Estimated size compositions of the bigeye caught in the EPO during the fourth quarter of 2009-2014. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 7b. Composición por tallas estimada para el patudo capturado en el OPO en el cuarto trimestre de 2009-2014. En cada recuadro se detalla el peso promedio de los peces en las muestras; t = toneladas métricas.

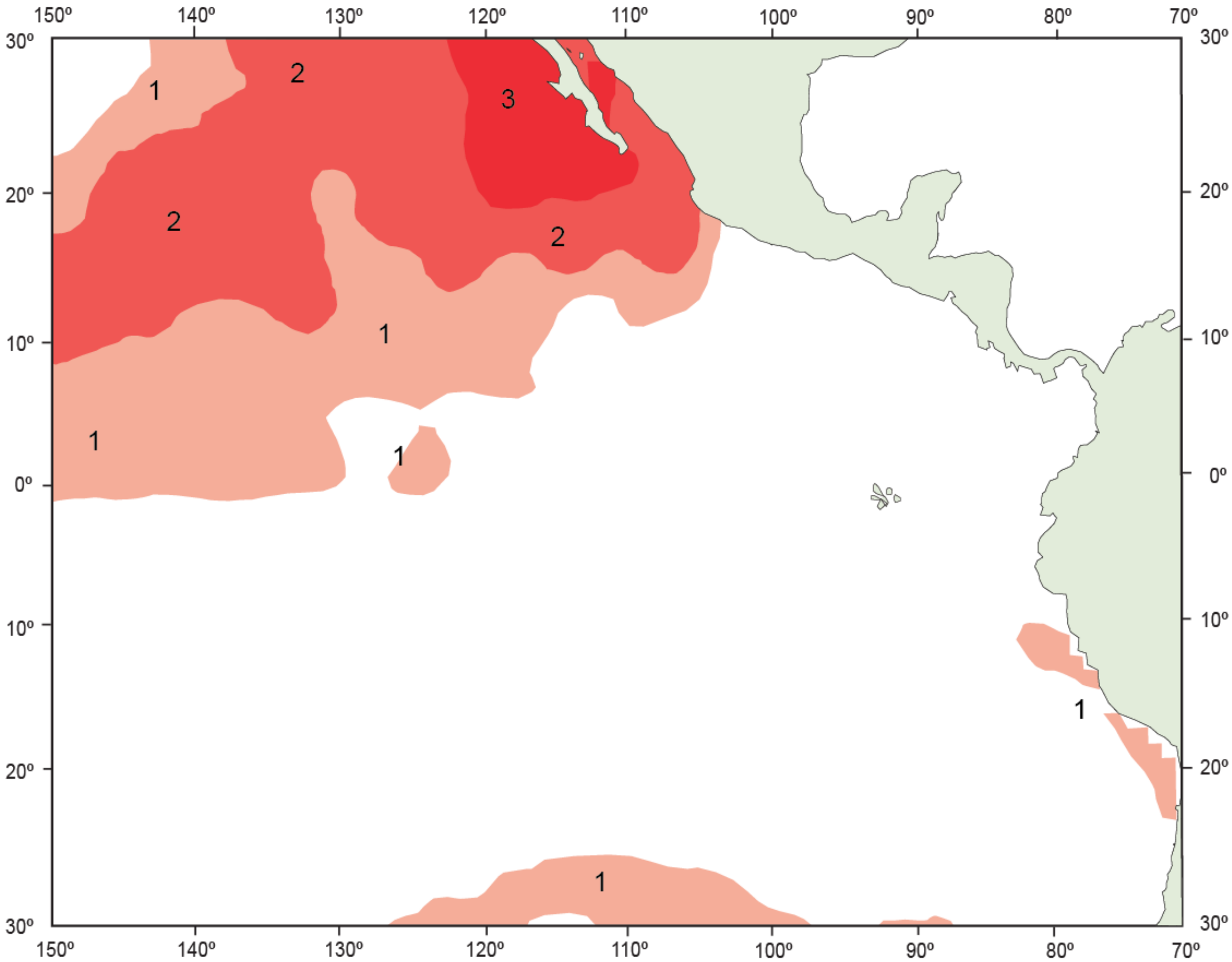

FIGURE 8. Sea-surface temperature (SST) anomalies (departures from long-term normals) for March 2015, based on data from fishing boats and other types of commercial vessels.
FIGURA 8. Anomalías (variaciones de los niveles normales a largo plazo) de la temperatura superficial del mar (TSM) en marzo de 2015, 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 2015 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 2015, 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	Gear	Well volume–Volumen de bodega				Capacity
Bandera	Arte	1-900	901-1700	>1700	Total	Capacidad
			Number—Número			
Colombia	PS	4	10	-	14	14,860
Ecuador	PS	74	25	13	112	91,599
UE(España)—EU(Spain)	PS	-	-	4	4	10,116
Guatemala	PS	-	1	-	1	1,475
México	PS	10	35	1	46	55,854
	LP	1	-	-	1	125
Nicaragua	PS	-	5	1	6	8,478
Panamá	PS	2	8	4	14	19,794
Perú	PS	3	-	-	3	1,869
El Salvador	PS	-	1	3	4	7,892
USA—EE.UU.	PS	-	2	-	2	2,829
Venezuela	PS	-	14	1	15	20,890
All flags—	PS	93	101	27	221	
Todas banderas	LP	1	-	-	1	
	PS + LP	94	101	27	222	
			Capacity—Capacidad			
All flags—	PS	45,432	133,235	56,989	235,656	
Todas banderas	LP	125	-	-	125	
	PS + LP	45,557	133,235	56,989	235,781	

TABLE 2. Preliminary estimates of the retained catches of tunas in the EPO, from 1 January through 29 March 2015, 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 29 de marzo de 2015, por especie y bandera del buque, en toneladas métricas**.**

Flag	Yellowfin	Skipjack	Bigeye	Pacific bluefin	Bonitos (*Sarda* spp.)	Albacore	Black skipjack	Other[1]	Total	Percentage of total
Bandera	**Aleta amarilla**	**Barrilete**	**Patudo**	**Aleta azul del Pacífico**	**Bonitos (*Sarda* spp.)**	**Albacora**	**Barrilete negro**	**Otras[1]**	**Total**	**Porcentaje del total**
Ecuador	8,465	64,221	9,713	-	3	-	-	-	82,402	48.9
México	32,003	2,303	-	-	-	-	180	-	34,486	20.5
Nicaragua	2,624	372	272	-	-	-	-	-	3,268	1.9
Panamá	7,283	10,312	1,687	-	-	-	-	-	19,282	11.4
Venezuela	7,415	1,694	38	-	-	-	-	-	9,147	5.4
Other—Otros[2]	5,529	13,866	691	-	9	-	-	-	20,095	11.9
Total	63,319	92,768	12,401	-	12	-	180	-	168,680	

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

TABLE 3. Estimated retained and discarded EPO catches, in metric tons, by purse-seine and pole-and-line vessels. “TUN” includes some catches reported by species (figate or bullet tunas) along with the unidentified tunas. The data for 2013-2014 are preliminary. Discard data were first collected by observers in 1993.

TABLA 3. Estimaciones de capturas del OPO retenidas y descartadas, en toneladas métricas, de buques cerqueros y caneros. “TUN” incluye algunas capturas reportadas por especie (melvas o petos) junto con los atunes no identificados. Los datos de 2013-2014 son preliminares. Los observadores toman datos sobre descartes desde 1993.

Year	Yellowfin			Skipjack			Bigeye			Pacific bluefin		
	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Año	Aleta amarilla			Barrilete			Patudo			Aleta azul del Pacífico		
	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total
1985	212,529	-	212,529	51,775	-	51,775	6,058	-	6,058	3,996	-	3,996
1986	263,049	-	263,049	67,555	-	67,555	2,686	-	2,686	5,040	-	5,040
1987	267,115	-	267,115	66,252	-	66,252	1,177	-	1,177	980	-	980
1988	281,016	-	281,016	91,438	-	91,438	1,540	-	1,540	1,379	-	1,379
1989	282,141	-	282,141	97,874	-	97,874	2,030	-	2,030	1,108	-	1,108
1990	265,929	-	265,929	75,192	-	75,192	5,921	-	5,921	1,491	-	1,491
1991	234,113	-	234,113	63,945	-	63,945	4,901	-	4,901	419	-	419
1992	231,910	-	231,910	86,240	-	86,240	7,179	-	7,179	1,928	-	1,928
1993	224,443	4,713	229,156	87,602	10,515	98,117	9,657	653	10,310	580	0	580
1994	212,033	4,525	216,558	73,366	10,491	83,857	34,899	2,266	37,165	969	0	969
1995	216,702	5,275	221,977	132,300	16,373	148,673	45,321	3,251	48,572	659	0	659
1996	242,369	6,312	248,681	106,528	24,494	131,022	61,311	5,689	67,000	8,333	0	8,333
1997	249,296	5,516	254,812	156,716	31,338	188,054	64,272	5,402	69,674	2,610	3	2,613
1998	259,044	4,697	263,741	142,315	22,643	164,958	44,129	2,822	46,951	1,772	0	1,772
1999	283,703	6,547	290,250	263,609	26,046	289,655	51,158	4,932	56,090	2,558	54	2,612
2000	255,694	6,207	261,901	205,878	24,468	230,346	95,282	5,417	100,699	3,773	0	3,773
2001	387,852	7,028	394,880	143,613	12,815	156,428	60,518	1,254	61,772	1,156	3	1,159
2002	413,236	4,140	417,376	154,162	12,506	166,668	57,421	949	58,370	1,761	1	1,762
2003	383,749	5,865	389,614	274,606	22,453	297,059	53,052	2,326	55,378	3,236	0	3,236
2004	274,441	3,000	277,441	198,352	17,078	215,430	65,471	1,574	67,045	8,880	19	8,899
2005	269,923	2,771	272,694	264,528	16,915	281,443	67,895	1,900	69,795	4,743	15	4,758
2006	167,317	1,534	168,851	296,703	11,177	307,880	83,838	1,680	85,518	9,928	0	9,928
2007	170,910	1,725	172,635	208,571	6,450	215,021	63,450	890	64,340	4,189	0	4,189
2008	185,871	696	186,567	297,102	8,249	305,351	75,028	2,086	77,114	4,407	14	4,421
2009	237,481	1,262	238,743	230,674	6,064	236,738	76,799	1,019	77,818	3,428	24	3,452
2010	251,469	1,031	252,500	147,239	2,769	150,008	57,752	564	58,316	7,746	0	7,746
2011	207,127	415	207,542	276,059	5,215	281,274	56,512	631	57,143	2,829	4	2,833
2012	198,417	451	198,868	266,518	3,511	270,029	66,020	473	66,493	6,705	0	6,705
2013	218,012	207	218,219	278,258	2,254	280,512	49,426	273	49,699	3,154	0	3,154
2014	233,049	517	233,566	261,782	2,596	264,378	59,600	83	59,683	4,862	66	4,928

TABLE 3. (continued)
TABLA 3. (continuación)

Year	Albacore			Bonitos (*Sarda* spp.)			Black skipjack			Unidentified tunas (TUN)			Total		
	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Año	Albacora			Bonitos (*Sarda* spp.)			Barrilete negro			Atunes no identificados (TUN)			Total		
	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total
1985	919	-	919	3,604	-	3,604	288	-	288	19	-	19	279,188	-	279,188
1986	133	-	133	490	-	490	569	-	569	181	-	181	339,703	-	339,703
1987	321	-	321	3,316	-	3,316	571	-	571	481	-	481	340,213	-	340,213
1988	288	-	288	9,550	-	9,550	956	-	956	79	-	79	386,246	-	386,246
1989	22	-	22	12,096	-	12,096	801	-	801	36	-	36	396,108	-	396,108
1990	209	-	209	13,856	-	13,856	787	-	787	200	-	200	363,585	-	363,585
1991	834	-	834	1,289	-	1,289	421	-	421	4	-	4	305,926	-	305,926
1992	255	-	255	977	-	977	105	-	105	24	-	24	328,618	-	328,618
1993	1	-	1	600	12	612	104	3,925	4,029	9	1,975	1,984	322,996	21,793	344,789
1994	85	-	85	8,693	147	8,840	188	857	1,045	9	498	507	330,242	18,784	349,026
1995	465	-	465	8,010	55	8,065	203	1,448	1,651	11	626	637	403,671	27,028	430,699
1996	83	-	83	654	1	655	704	2,304	3,008	37	1,028	1,065	420,019	39,828	459,847
1997	60	-	60	1,105	4	1,109	100	2,512	2,612	71	3,383	3,454	474,230	48,158	522,388
1998	123	-	123	1,337	4	1,341	528	1,876	2,404	13	1,233	1,246	449,261	33,275	482,536
1999	274	-	274	1,719	0	1,719	171	3,404	3,575	27	3,092	3,119	603,219	44,075	647,294
2000	157	-	157	636	0	636	293	1,995	2,288	190	1,410	1,600	561,903	39,497	601,400
2001	160	-	160	17	0	17	2,258	1,019	3,277	191	679	870	595,765	22,798	618,563
2002	412	-	412	0	0	0	1,467	2,283	3,750	576	1,863	2,439	629,035	21,742	650,777
2003	93	-	93	1	0	1	439	1,535	1,974	80	1,238	1,318	715,256	33,417	748,673
2004	231	-	231	16	35	51	884	387	1,271	256	973	1,229	548,531	23,066	571,597
2005	68	-	68	313	18	331	1,472	2,124	3,596	190	1,922	2,112	609,132	25,665	634,797
2006	110	-	110	3,519	80	3,599	1,999	1,972	3,971	50	1,910	1,960	563,464	18,353	581,817
2007	208	-	208	16,013	628	16,641	2,306	1,625	3,931	598	1,221	1,819	466,245	12,539	478,784
2008	1,099	-	1,099	7,883	37	7,920	3,624	2,251	5,875	137	1,380	1,517	575,151	14,713	589,864
2009	2,268	2	2,279	9,720	15	9,735	4,256	1,020	5,276	162	469	631	564,788	9,875	574,663
2010	25	-	25	2,824	19	2,843	3,425	1,079	4,504	136	709	845	470,616	6,171	476,787
2011	10	-	10	7,987	45	8,032	2,317	719	3,036	108	784	892	552,949	7,813	560,762
2012	-	-	-	8,191	156	8,347	4,504	440	4,944	41	354	395	550,396	5,385	555,781
2013	-	-	-	2,063	9	2,072	3,554	805	4,359	53	461	514	554,520	4,009	558,529
2014	-	-	-	2,821	38	2,859	4,083	486	4,569	115	328	443	566,312	4,114	570,426

TABLE 4. Preliminary estimates of the retained catches in metric tons, of tunas and bonitos caught by purse-seine vessels in the EPO in 2013 and 2014, by species and vessel flag. The data for yellowfin, skipjack, and bigeye tunas have been adjusted to the species composition estimates, and are preliminary.

TABLA 4. Estimaciones preliminares de las capturas retenidas, en toneladas métricas, de atunes y bonitos por buques cerqueros en el OPO en 2013 y 2014, por especie y bandera del buque. Los datos de los atunes aleta amarilla, barrilete, y patudo fueron ajustados a las estimaciones de composición por especie, y son preliminares.

	Yellowfin	Skipjack	Bigeye	Pacific bluefin	Albacore	Black skipjack	Bonito	Unidentified tunas	Total	Percent
	Aleta amarilla	Barrilete	Patudo	Aleta azul	Albacora	Barrilete negro	Bonito	Atunes no identificados	Total	Porcentaje
2013	**Retained catches—Capturas retenidas**									
Colombia	16,570	22,089	1,390	-	-	14	-	-	40,063	7.2
Ecuador	27,725	172,080	32,217	-	-	629	802	18	233,471	42.2
EU (España)	516	2,904	1,662	-	-	-	-	-	5,082	0.9
México	113,619	17,185	122	3,154	-	2,858	1,260	16	138,214	25.0
Nicaragua	8,280	4,329	2,720	-	-	-	-	-	15,329	2.8
Panamá	18,428	30,951	6,062	-	-	40	-	-	55,481	10.0
Venezuela	24,962	17,410	952	-	-	13	-	6	43,343	7.8
Other-Otra[1]	7,158	11,143	4,301	-	-	-	1	13	22,616	4.1
Total	217,258	278,091	49,426	3,154	-	3,554	2,063	53	553,599	
2014	**Retained catches–Capturas retenidas**									
Colombia	17,220	22,806	2,370	-	-	10	-	-	42,406	7.5
Ecuador	37,675	173,048	37,958	-	-	674	1,855	67	251,277	44.5
EU (España)	768	5,570	2,753	-	-	-	-	-	9,091	1.6
México	120,996	8,789	38	4,862	-	3,391	964	48	139,088	24.4
Nicaragua	8,151	6,353	2,935	-	-	1	-	-	17,440	3.1
Panamá	19,446	22,002	8,118	-	-	5	2	-	49,573	8.8
Venezuela	22,900	13,861	1,191	-	-	2	-	-	37,954	6.7
Other-Otra[2]	5,733	9,236	4,237	-	-	-	-	-	19,206	3.4
Total	232,889	261,665	59,600	4,862	-	4,083	2,821	115	566,035	

[1] Includes El Salvador, Guatemala, Peru, and Vanuatu This category is used to avoid revealing the operations of individual vessels or companies.
[1] Incluye El Salvador, Guatemala, Perú, y Vanuatú Se usa esta categoría para no revelar información sobre las actividades de buques o empresas individuales.
[2] Includes El Salvador, Guatemala, Peru. and United States This category is used to avoid revealing the operations of individual vessels or companies.
[2] Incluye El Salvador, Estados Unidos, Guatemala, y Perú Se usa esta categoría para no revelar información sobre las actividades de buques o empresas individuales.

TABLE 5a. Catches of bigeye tuna, in metric tons, in the eastern Pacific Ocean during 2014 by longline vessels more than 24 meters in overall length.
TABLA 5a. Capturas de atún patudo, en toneladas métricas, en el Océano Pacífico oriental durante 2014 por buques palangreros de más de 24 metros en eslora total.

Flag—Bandera	Quarter—Trimestre				Total
	1	2	3	4	
China	1,561	1,448	1,561	2,895	7,465
Japan—Japón	3,623	2,227	2,989	5,719	14,558
Republic of Korea—República de Corea*	1,666	1,045	1,628	3,245	7,584
Chinese Taipei—Taipei Chino	1,304	193	859	2,393	4,749
United States—Estados Unidos	-	-	-	-	476
Vanuatu	-	-	-	-	-
Total	8,154	4,913	7,037	14,252	34,832

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

TABLE 5b. Preliminary estimates of the catches of bigeye tuna, in metric tons, in the eastern Pacific Ocean during the first quarter of 2015 by longline vessels more than 24 meters in overall length.
TABLA 5b. Estimaciones preliminares de las capturas de atún patudo, en toneladas métricas, en el Océano Pacífico oriental durante el primer trimestre de 2015 por buques palangreros de más de 24 metros en eslora total.

Flag—Bandera	Month—Mes			Total
	1	2	3	
China	411	355	583	1,349
Japan—Japón	1,545	1,126	884	3,555
Republic of Korea—República de Corea*	823	674	854	2,351
Chinese Taipei—Taipei Chino	516	240	182	938
United States— Estados Unidos	-	-	-	-
Vanuatu	-	-	-	-

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

TABLE 6. Oceanographic and meteorological data for the Pacific Ocean, April 2014-March 2015. The values in parentheses are anomalies. SST = sea-surface temperature; SOI = Southern Oscillation Index; SOI* and NOI* are defined in the text.
TABLA 6. Datos oceanográficos y meteorológicos del Océano Pacífico, abril 2014-marzo 2015. 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	**4**	**5**	**6**	**7**	**8**	**9**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	24.7 (-0.9)	22.9 (-1.4)	21.5 (-1.4)	20.3 (-1.3)	19.7 (-1.0)	19.8 (-0.6)
Area 2 (5°N-5°S, 90°-150°W	27.4 (-0.2)	26.4 (-0.7)	25.8 (-0.6)	25.0 (-0.7)	24.4 (-0.6)	24.7 (-0.1)
Area 3 (5°N-5°S, 120°-170°W)	27.7 (-0.1)	27.6 (-0.3)	27.4 (-0.2)	26.9 (-0,3)	26.5 (-0.3)	26.7 (-0.1)
Area 4 (5°N-5°S, 150W°-160°E)	28.5 (0.0)	28.7 (-0.1)	28.8 (-0.1)	28.8 (0.0)	28.7 (0.0)	28.7 (0.0)
Thermocline depth—Profundidad de la termoclina, 0°-80°W	10	25	25	25	30	20
Thermocline depth—Profundidad de la termoclina, 0°-110°W	55	30	60	60	55	60
Thermocline depth—Profundidad de la termoclina, 0°-150°W	120	105	130	140	150	140
Thermocline depth—Profundidad de la termoclina, 0°-180°	175	180	175	170	170	160
SOI—IOS	0.2	0.8	1.2	0.8	0.2	0.3
SOI*—IOS*	-1.29	4.79	6.91	3.37	2.18	-0.80
NOI*—ION*	2.73	1.36	1.16	0.47	-1.30	-0.26

TABLE 6. (continued)
TABLA 6. (continuación)

Month—Mes	**10**	**11**	**12**	**1**	**2**	**3**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	20.2 (-0.6)	21.1 (-0.5)	22.6 (-0.2)	24.8 (0.3)	25.4 (-0.8)	25.9 (-0.8)
Area 2 (5°N-5°S, 90°-150°W	24.7 (-0.2)	24.8 (-0.2)	25.1 (0.0)	25.3 (-0.4)	25.6 (-0.8)	26.9 (-0.2)
Area 3 (5°N-5°S, 120°-170°W)	26.4 (-0.3)	26.7 (0.0)	26.5 (0.0)	26.1 (-0.5)	26.2 (-0.6)	27.0 (-0.2)
Area 4 (5°N-5°S, 150W°-160°E)	28.7 (0.0)	28.9 (0.3)	28.6 (0.2)	28.1 (-0.2)	28.4 (0.3)	28.7 (0.5)
Thermocline depth—Profundidad de la termoclina, 0°-80°W	30	30	35	35	15	10
Thermocline depth—Profundidad de la termoclina, 0°-110°W	80	80	120	45	25	60
Thermocline depth—Profundidad de la termoclina, 0°-150°W	140	165	155	140	150	160
Thermocline depth—Profundidad de la termoclina, 0°-180°	180	180	170	185	180	180
SOI—IOS	-0.1	0.7	0.1	1.4	0.1	-0.9
SOI*—IOS*	-0.55	3.28	0.41	1.61	1.77	1.20
NOI*—ION*	0.93	0,14	4.97	3.98	-0.95	-0.60

TABLE 7. Preliminary data on the sampling coverage of trips of tuna purse seine vessels deployed 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 first quarter of 2015. The numbers in parentheses indicate cumulative totals for the year.
TABLA 7. Datos preliminares de la cobertura de muestreo de viajes de buques atuneros de cerco asignados 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 primer trimestre de 2015. Los números entre paréntesis indican los totales acumulados para el año.

Flag	Trips		Class-6—Observed by program								Percent observed	
			IATTC		National		WCPFC		Total			
Bandera	Viajes		Clase-6–Observado por programa								Porcentaje observado	
			CIAT		Nacional		WCPFC		Total			
Colombia	11	(11)	6	(6)	5	(5)			11	(11)	100.0	(100)
Ecuador	123	(123)	81	(81)	42	(42)			123	(123)	100.0	(100)
El Salvador	4	(4)	3	(3)			1	(1)	4	(4)	100.0	(100)
EU (Spain—UE (España)	8	(8)	2	(2)	6	(6)			8	(8)	100.0	(100)
Guatemala	1	(1)	1	(1)					1	(1)	100.0	(100)
México	74	(74)	34	(34)	40	(40)			74	(74)	100.0	(100)
Nicaragua	7	(7)	2	(2)	5	(5)			7	(7)	100.0	(100)
Panamá	24	(24)	12	(12)	12	(12)			24	(24)	100.0	(100)
Perú	10	(10)	10	(10)					10	(10)	100.0	(100)
U.S.A.—E.U.A.	2	(2)	2	(2)					2	(2)	100.0	(100)
Venezuela	15	(15)	7	(7)	8	(8)			15	(15)	100.0	(100)
Total	279	(279)	160	(160)	118	(118)	1	(1)	279	(279)	100.0	(100)