INTER-AMERICAN TROPICAL TUNA COMMMISSION
COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

QUARTERLY REPORT—INFORME TRIMESTRAL

January-March 2013—Enero-Marzo 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 first 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

IATTC meeting

The fourth Technical Meeting on Sharks was held in La Jolla, California, USA, on 12-14 February 2013. During the previous three meetings IATTC staff members worked with scientists of IATTC member nations and other nations of the region to identify and collate sources of fishery and biological data, discussed uncertainties, and initiated the development of a model for stock assessment. The objective of the fourth Technical Meeting was to give scientists of organizations other than the IATTC an opportunity to comment on the results of the IATTC staff's preliminary stock assessment of silky sharks. Those comments were to be taken into account in the preparation of the staff's report on silky shark stock assessment that was to be presented at the Fourth Meeting of the IATTC Scientific Advisory Committee in May 2013.

Other meetings

Dr. Guillermo A. Compeán participated in a meeting, "Sustainable Fishery Agreements: Strategies for Enforcement and Compliance" in Maui, Hawaii, on 15-18 January 2013. The meeting was sponsored by the International Seafood Sustainability Foundation (ISSF). Its purpose was to build upon progress made at previous ISSF-sponsored meetings held in Bellagio, Italy, Napa, California, USA, and Cordoba, Spain, to achieve optimum international compliance with rights-based fisheries management agreements. Dr. Compeán gave a presentation on the Agreement on the International Dolphin Conservation Program at the meeting.

Dr. Compeán also participated, as an observer, in the first meeting of the Commission for the South Pacific Regional Fisheries Management Organisation (SPRFMO), which took place in Auckland, New Zealand, from 28 January to 1 February 2013.

The SPRFMO, which entered into force on 24 August 2012, is an intergovernmental 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. It consists of a Commission and several subsidiary bodies. The members of the Commission are Australia, Belize, Chile, Chinese Taipei, Cook Islands, Cuba, the European Union, Denmark (in respect of the Faroe Islands), New Zealand, the Republic of Korea, and the Russian Federation. Dr. Robin L. Allen, former Director of the IATTC, is the Executive Director of the SPRFMO.

Dr. Robert J. Olson participated in the Second CLIOTOP Symposium, held in Noumea, New Caledonia, during the period of 11-15 February 2013. CLIOTOP (Climate Impacts on Oceanic Top Predators) is an international program that began in 2004 under GLOBEC (Global Ocean Ecosystem Dynamics, www.globec.org), a component of the International Geosphere-Biosphere Programme (IGBP). CLIOTOP now operates under the umbrella of IMBER (Integrated Marine Biochemistry and Ecosystem Research, www.imber.org). Dr. Olson was the convener of a session on Trophic Pathways in Open-Ocean Ecosystems, and presented a paper co-authored with Ms. Leanne M. Duffy and others, entitled "Decadal Diet Shift in Yellowfin Tuna (*Thunnus albacares*) Suggests Broad-Scale Food Web Changes in the Eastern Tropical Pacific Ocean." Dr. Olson also presented a paper, co-authored with Ms. Duffy (the principal author) and others, entitled "Foraging Ecology of Silky Sharks, *Carcharhinus falciformis,* in the Eastern Tropical Pacific Ocean." Drs. Olson and Jock Young, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia, led a panel discussion about trophic pathways in open-ocean ecosystems. Drs. Olson, Frederic Menard, Institut de Recherche pour le Développement (IRD), France, and Young are the co-chairs of CLIOTOP Working Group 3. Dr. Olson's travel expenses were shared by the IATTC and IMBER-CLIOTOP.

Dr. Daniel Margulies participated in the World Aquaculture Society's Aquaculture 2013 Conference in Nashville, Tennessee, USA, on 21-25 February 2013. Dr. Margulies presented a paper at a special session on tuna entitled "Comparative Research on the Reproductive Biology and Early Life History of Pacific Bluefin Tuna (*Thunnus orientalis*) and Yellowfin Tuna (*Thunnus albacares*)," with co-authors Mr. Vernon P. Scholey, Ms. Jeanne B. Wexler, Ms. Maria S. Stein, Dr. Yoshifumi Sawada, Dr. Yang-Su Kim, Mr. Tomoki Honryo, and Mr. Angel Guillén. Members of the IATTC's Early Life History Group were also co-authors of two poster presentations made by Kinki University scientists. The poster presentations were entitled "Investigation of Suitable Water Temperature and Salinity for Hatching and Early Larval Stages of Yellowfin Tuna" and "Gross Energy Consumption in Yellowfin Tuna Eggs with Embryonic Development." All of the presentations were summaries of research results from current joint studies of yellowfin and Pacific bluefin tuna as part of the SATREPS (Science and Technology Research Partnership for Sustainable Development) project.

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 26-28 February 2013.

Drs. Guillermo A. Compeán, Richard B. Deriso, Mark N. Maunder, Alexandre Aires-da-Silva, and Carolina Minte-Vera participated in an International Seafood Sustainability Foundation (ISSF) Stock Assessment Workshop: Harvest Control Rules and Reference Points for Tuna RFMOs [Regional Fisheries Management Organizations] in San Diego, California, USA, on 6-8 March 2013. Dr. Maunder gave a presentation "Practicalities of Reference Points, Decision Rules, and Management Strategy Evaluation for Tunas and Associated Species in the Eastern Pacific Ocean," co-authored with Drs. Aires da Silva and Deriso.

Dr. Compeán also participated in a Centro de Investigaciones Biológicos del Noreste S.C. (CIBNOR) and a Reunión de la Comisión Dictaminadora Externa in La Paz, Mexico, on 12-13 March 2013.

Drs. Richard B. Deriso, Mark N. Maunder, Alexandre Aires-da-Silva, and Carolina Minte-Vera participated in a technical workshop entitled Selectivity: Theory, Estimation, and Application in Fishery Stock Assessment Models hosted by the Center for the Advancement of Population Assessment Methodology (CAPAM) in La Jolla, California, USA, on 11-14 March 2013. Dr. Maunder, CAPAM co-founder, co-organized and chaired the workshop. CAPAM is described in the IATTC Quarterly Report for July-September 2012.

RESEARCH

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 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 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 182 length-frequency samples from 122 wells and abstracted logbook information for 227 trips of commercial fishing vessels during the first quarter of 2013.

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 2013 is about 215,000 m^3 (Table 1). The average weekly at-sea capacity for the fleet, for the weeks ending 1 January through 31 March, was about 131,900 m^3 (range: 49,600 to 161,200 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 2013, and comparative statistics for 2008-2012, were:

Species	**2013**	**2008-2012**			**Weekly average, 2013**
		Average	**Minimum**	**Maximum**	
Yellowfin	51,800	61,400	54,200	66,900	4,000
Skipjack	78,600	67,500	50,800	93,100	6,000
Bigeye	8,400	11,300	8,500	15,500	600

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

Catch statistics for 2012

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 1983-2012 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 5 to 10 percent of the total catch of yellowfin is taken by longlines. 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 2012 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 2012-28 September 2012	18 November 2012-18 January 2013

(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 2012. 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 2012, and final estimates of the 1997-2011 annual averages of those species, based on the methods described at the beginning of this section, are as follows:

Species	**2012**	**Average**	**Minimum**	**Maximum**
			1997-2011	
Yellowfin	190,000	266,000	167,000	413,000
Skipjack	271,000	218,000	142,000	297,000
Bigeye	69,000	65,000	44,000	95,000

The 2012 catch of yellowfin was about 76 thousand t (29 percent) less than the average for 1997-2011. The 2012 skipjack catch was about 53 thousand t (24 percent) greater than the average for 1997-2011. The 2012 bigeye catch was about 4 thousand t (6 percent) greater than the average for 1997-2011.

The average annual distributions of the purse-seine catches of yellowfin, skipjack, and bigeye, by set type, in the EPO during 2007-2011, are shown in Figures 1a, 2a, and 3a, and preliminary estimates for 2012 are shown in Figures 1b, 2b, and 3b.

The majority of the yellowfin catches in 2012 were taken from the areas north of 5°N and east of 140°W. Catches of yellowfin on dolphins were greatest in the inshore areas off the coast of Central America. Offshore catches on dolphins around the equator were greater than the 2007-2011 average. Yellowfin catches on unassociated schools in 2012 were concentrated mainly in the inshore areas off southern Mexico. Inshore catches around the equator were less than the 2007-2011 average. Yellowfin catches on floating objects in the coastal area between 10°S and 20°S were greater than the 2007-2011 average.

Inshore skipjack catches in 2012 were similar to those of previous years. The catches were greater than the 2007-2011 average in the area west of 130°W, and were caught almost exclusively on floating objects, except for the catches around 10°N, which were caught mostly on unassociated schools.

Bigeye are not often caught by surface gear 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 fish-aggregating devices (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 fish associated with 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 12.5 thousand t in 2012, which is greater than the 1997-2011 annual average retained catch of about 5.5 thousand t (range: 500 to 19 thousand t).

Preliminary estimates of the retained catches in the EPO in 2012, 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 2012 were as follows:

Flag	**Retained catches**	
	Metric tons	**Percentage**
Ecuador	230,200	42
Mexico	127,100	23
Panama	48,900	9
Venezuela	45,100	8

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, which might identify whether a vessel was directing its effort toward a specific species.

The measures of catch rate used in analyses are based on fishing trips landing predominantly yellowfin, skipjack, bigeye, and bluefin tuna. The great majority of the purse-seine catches of yellowfin, skipjack, and bigeye are made by Class-6 vessels (vessels with fish-carrying capacities greater than 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 2012 and comparative statistics for 2007-2011 are:

Region	Species	Gear	2012	2007-2011		
				Average	Minimum	Maximum
N of 5° N	Yellowfin	PS	11.2	11.2	8.1	13.2
S of 5° N			3.3	2.7	2.4	3.2
N of 5° N	Skipjack	PS	2.6	2.1	1.1	3.1
S of 5° N			8.9	9.3	6.7	11.4
EPO	Bigeye	PS	2.3	2.4	2.2	2.8
EPO	Yellowfin	LP	3.1	4.7	2.1	9.2
EPO	Skipjack	LP	1.1	0.8	0.5	1.2

Catch statistics for the longline fishery

The catches of bigeye by longline gear in the EPO are reported by flag states whose annual catches have exceeded 500 t (C-09-01 Tuna conservation 2009-2011). The catches that have been reported for January-December 2012 are shown in Table 5a, and preliminary estimates of those reported for the first quarter of 2013 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, the USA, and Venezuela. The catches of yellowfin and skipjack were first sampled in 1954, bluefin in 1973, and bigeye in 1975.

Data for fish caught during the fourth quarter of 2007-2012 are presented in this report. Two sets of length-frequency histograms are presented for each species; the first shows the data by stratum (gear type, set type, and area) for the fourth quarter of 2012, and the second shows data for the combined strata for the fourth quarter of each year of the 2007-2012 period. Samples were obtained from 165 wells that contained fish caught during the fourth quarter of 2012.

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 165 wells sampled that contained fish caught during the fourth quarter of 2012, 85 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 and Inshore areas. Smaller amounts of yellowfin were also taken in the Southern dolphin fishing area, in floating-object sets, and in the Northern unassociated set area.

The estimated size compositions of the yellowfin caught by all fisheries combined during the fourth quarters of 2007-2012 are shown in Figure 5b. The average weight of the yellowfin caught during the fourth quarter of 2012 (10.7 kg) was less than the average weight for 2011 (15.3 kg), but slightly greater than the average of the previous five years combined.

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 165 wells sampled that contained fish caught during the fourth quarter of 2012, 128 contained skipjack. The estimated size compositions of these fish are shown in Figure 6a. The majority of the skipjack catch was in the 40- to 50-cm range, with large amounts caught in the Equatorial and Southern floating-object fisheries and the Southern unassociated fishery, and lesser amounts of this size range caught in the Northern floating-object fishery. Larger skipjack in the 60- to 80-cm range were caught in the Northern unassociated fishery, and smaller ones in the 40- to 55-cm range in the Southern floating-object fishery.

The estimated size compositions of the skipjack caught by all fisheries combined during the fourth quarters of 2007-2012 are shown in Figure 6b. The average weight of the skipjack caught during the fourth quarter of 2012 (2.4 kg) was less than the average weight of 2011 (3.6 kg), but equal to the average of the previous five years combined.

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 165 wells sampled that contained fish caught during the fourth quarter of 2012, 42 contained bigeye. The estimated size compositions of these fish are shown in Figure 7a. All of the catch was taken in floating-object sets, primarily in the Northern, Equatorial, and Southern areas, with the majority of this catch in the 40- to 80-cm range.

The estimated size compositions of the bigeye caught by all fisheries combined during the fourth quarter of 2007-2012 are shown in Figure 7b. The average weight of bigeye caught during the fourth quarter of 2012 (5.1 kg) was less than the average weight in 2011 (7.3 kg), and slightly less than the average of the previous five years combined.

The estimated retained purse-seine catch of bigeye less than 60 cm in length during the fourth quarter of 2012 was 4,900 t, or about 35 percent of the estimated total retained purse-seine catch of bigeye during that period. The corresponding amounts for 2007-2011 ranged from 1,500 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

Tuna tagging

Messrs. Kurt M. Schaefer and Daniel W. Fuller spent the period of 28 February 14 March 2013, aboard the 28-meter sport-fishing vessel *Royal Star*, along with 19 anglers, on a regularly-scheduled fishing trip to Clipperton Island, where they tagged yellowfin tuna with archival tags and conventional dart tags. The trip was successful, as 50 yellowfin (73-142 cm in length; mean = 97.5 cm) were landed aboard the vessel, measured, tagged, and released. Each fish was tagged with a Lotek Wireless LAT 2810 archival tag implanted into its coelomic cavity and a Hallprint plastic dart tag implanted at the base of its second dorsal fin.

Early life history studies

Yellowfin broodstock

The yellowfin broodstock in Tank 1 (1,362,000 L) at the Achotines Laboratory spawned daily through February 10, except for January 7, 14, 21, and 24, and then stopped for the remainder of the quarter. Spawning occurred between 6:30 p.m. and 11:50 p.m. The numbers of eggs collected after each spawning event ranged from about 27,000 to 384,000. The water temperatures in the tank during the quarter ranged from 22.1° to 27.8°C.

At the end of the quarter there were two 65- to 70-kg yellowfin, four 26- to 48-kg yellowfin, and two 15-kg yellowfin in Tank 1.

Rearing of yellowfin eggs, larvae, and juveniles

During the quarter, the following parameters were recorded for most spawning events: times of spawning, egg diameter, duration of egg stage, hatching rate, lengths of hatched larvae, and duration of yolk-sac stage. The weights of the eggs, yolk-sac larvae, and first-feeding larvae, and the lengths and selected morphometrics of these, were measured periodically.

Comparative studies of yellowfin and Pacific bluefin larvae

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

As part of the SATREPS project, Ms. Susana Cusatti, Achotines Laboratory biologist, spent the period of March 1-23, 2013, at the Oshima Laboratory and the Nara Campus of Kinki University in Japan. During her stay, she received training in advanced DNA extraction, purification, and quantifying methods, utilizing eggs and tissue samples of yellowfin broodstock from the Achotines Laboratory. She also applied these techniques to tissue samples of yellowfin that were caught in Panamanian coastal waters. Ms. Cusatti’s travel expenses were paid by SATREPS and Kinki University.

Studies of snappers

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

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

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.

In February and March of 2012 an area of cool water extended from southern Baja California to the Equator at about 125°W, and then westward along the Equator to west of 180° (IATTC Quarterly Report for January-March 2012: Figure 8). This area of cool water moved northward during the ensuing months and persisted through September. A large area of warm water appeared off southern Peru and northern Chile in February 2012, and this persisted through July. In April a portion of this area of warm water extended westward along the equator to about 115°W. This extension retreated in May, but then extended further to the west in June (IATTC Quarterly Report for April-June 2012: Figure 5). It began to weaken in August and nearly disappeared in September. In December a small area of warm water formed off Mexico and a short tongue of cool water formed along the Equator off Ecuador (IATTC Quarterly Report for October-December 2012: Figure 6). There were spots of cool water along the equator during January-February 2013 and offshore off Mexico and far offshore south of 20°S during January-March 2013 (Figure 8). The SSTs were mostly above normal from June through November 2012 and mostly below normal from December 2012 through February 2013 (Table 6). 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 March 2013, “Most models forecast … SSTs to remain … neutral through the Northern Hemisphere fall … with dynamical models tending to predict warmer conditions ([anomalies of] 0°C to 0.5°C) than the statistical models ([anomalies of] -0.5°C to 0°C). There is less confidence in the forecasts for the last half of the year, partly because of the so-called ‘spring barrier,’ which historically leads to lower model skill beginning in late [northern] spring. Thus, … neutral is favored into the Northern Hemisphere summer 2013.”

BYCATCH PROGRAM AND INTERNATIONAL DOLPHIN CONSERVATION PROGRAM

Data collection

The IATTC had field offices at Las Playas and Manta, Ecuador; Manzanillo and Mazatlan, Mexico; Panama, Republic of Panama; and Cumaná, Venezuela, during the first quarter of 2013. Members of the field office staffs placed IATTC observers on 140 fishing trips by vessels that participate in the International Dolphin Conservation Program (IDCP) during the quarter. This figure includes five trips sampled under the Memorandum of Cooperation (MOC) of the Cross-Endorsement of WCPFC [Western and Central Pacific Fisheries Commission] and IATTC Observer Programs When Observing on the High Seas of the Convention Areas of Both Organizations described below.

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 International Dolphin Conservation Program (IDCP), 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, under the MOC.

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 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 any such vessel carries an observer of the IDCP.

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 are to sample half, and that of Ecuador approximately one-third, of the trips by vessels of their respective fleets, while IATTC observers are to sample the remainder of those trips. Except as described in the next paragraph, the IATTC is to cover all trips by vessels registered in other nations that are required to carry observers.

At the fifth meeting of the Parties to the AIDCP in June 2001, observers from the international observer program of the South Pacific Forum Fisheries Agency (FFA) were approved to collect pertinent information for the On-Board Observer Program, pursuant to Annex II (9) of the AIDCP in cases for which the Director determines that the use of an observer from the AIDCP On-Board Observer Program is not practical. In 2011, the IATTC and Western and Central Pacific Fisheries Commission (WCPFC) member nations agreed on the Memorandum of Cooperation (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, one Party to both organizations and to the AIDCP requested that cross-endorsed observers be allowed to be deployed on fivc trips of vessels planning to operate in both areas. These requests were granted.

Observers from the On-Board Observer Program departed on 245 fishing trips aboard purse seiners covered by that program during the first quarter of 2013. Preliminary coverage data for these vessels during the quarter are shown in Table 7.

Training

No training sessions were held for any of the observer programs during the first quarter of 2013.

Gear project

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

INTER-AGENCY COOPERATION

Dr. William H. Bayliff served as a member of the thesis committee of a Ph.D. candidate at the University of Queensland, Australia, during the first quarter of 2013.

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Taylor, Ian G., Vladlena Gertseva, Richard D. Methot, Jr., and Mark N. Maunder. 2013. A stock–recruitment relationship based on pre-recruit survival, illustrated with application to spiny dogfish shark. Fish. Res., 142: 15-21.

Wexler, Jeanne B., Daniel Margulies, Vernon P. Scholey, y Maria S. Stein. El Laboratorio de Achotines. Panama Fishing Magazine, March 29, 2013: 6-8.

VISITORS

Achotines Laboratory

Sir Peter Crane, Dean of the Yale University School of Forestry and Environmental Studies, visited the Achotines Laboratory on January 6 and 7, 2013.

Mr. Jack Hanna, his wife Suzi, and a small production crew visited the Achotines Laboratory on February 22, 2013, to film a segment for "Jack Hanna's Wild Countdown." (Jack Hanna has been a popular host for nature television programs in the United States for many years.)

ADMINISTRATION

Dr. Juan Valero, a citizen of Argentina, began a visit of about one year at the IATTC headquarters in La Jolla on 1 January 2013. He will be working principally with Dr. Mark N. Maunder and with Dr. Paul R. Crone of the U.S. National Marine Fisheries Service. The funding for his visit is coming from the AD Model Builder Foundation and the Center for the Advancement of Population Assessment Methodology (CAPAM). His CAPAM research will focus mainly on selectivity, which is also the topic of a workshop that Dr. Maunder chaired in March 2013. (CAPAM is described in the IATTC Quarterly Report for July-September 2012.)

Dr. Carolina Minte-Vera, a graduate of the University of Washington, joined the Stock Assessment Program of the IATTC on 1 March 2013. That program has been understaffed for quite some time, so it is fortunate to have an additional capable scientist to share the workload.

Mr. Edward H. Everett retired on March 31, 2013. Mr. Everett was hired in June 1978 and assigned to the Manta field office, where he worked for more than three years before being transferred to La Jolla in 1981. Since then he has worked for the Data Collection and Database Program. Among other things, he has made frequent trips to the field offices, keeping things working smoothly there. The importance of this cannot be overstated, as virtually all of the catch, effort, and length-frequency data for the surface fisheries for tunas in the EPO are collected at the field offices. In addition, the field office personnel also abstract logbooks, collect tags and information on the recapture of the fish bearing the tags and pay the rewards for them, *etc*. They also perform other tasks, such as the collection of supplemental retained catch data for small purse seiners performed under a contract awarded to the IATTC by the U.S, National Marine Fisheries Service, which was carried out from 2005 to 2009. Also, Mr. Everett worked intermittently at the Achotines Laboratory during the early 1980s, tagged juvenile bluefin tuna in Japan in 1982, and filled in at the IATTC's Ensenada office during 1984-1985 between Mr. William Hatton's departure and the hiring of Mr. Eric Pedersen.

Mr. Everett will be sorely missed, but everyone wishes him the best during his years of retirement.

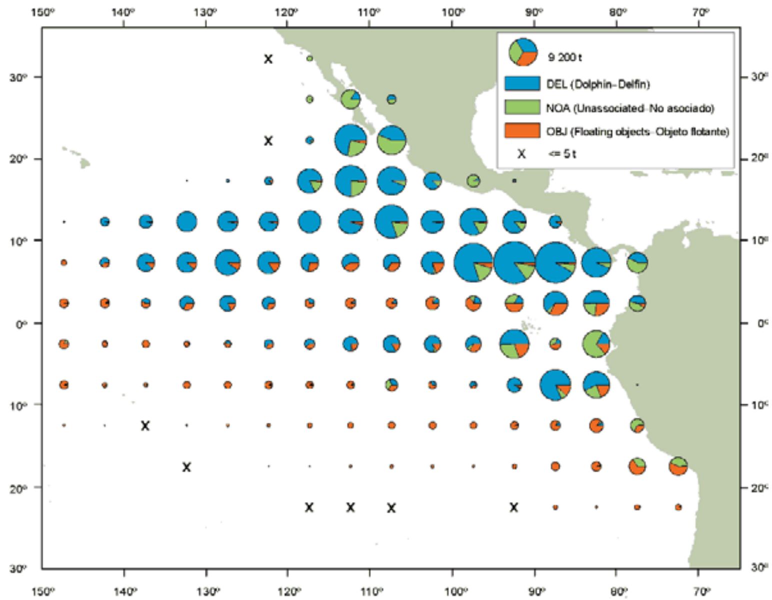

FIGURE 1a. Average annual distributions of the purse-seine catches of yellowfin, by set type, 2007-2011. The sizes of the circles are proportional to the amounts of yellowfin caught in those 5° by 5° areas. t = metric tons.

FIGURA 1a. Distribución media anual de las capturas cerqueras de aleta amarilla, por tipo de lance, 2007-2011. El tamaño de cada círculo es proporcional a la cantidad de aleta amarilla capturado en la cuadrícula de 5° x 5° correspondiente. t = toneladas métricas.

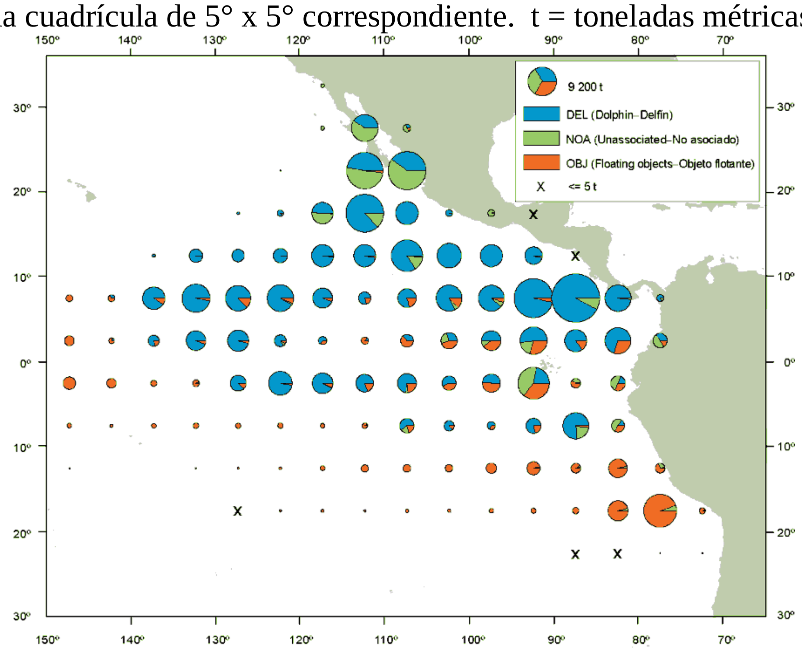

FIGURE 1b. Annual distributions of the purse-seine catches of yellowfin, by set type, 2012. The sizes of the circles are proportional to the amounts of yellowfin caught in those 5° by 5° areas. t = metric tons.

FIGURA 1b. Distribución anual de las capturas cerqueras de aleta amarilla, por tipo de lance, 2012. El tamaño de cada círculo es proporcional a la cantidad de aleta amarilla capturado en la cuadrícula de 5° x 5° correspondiente. t = toneladas métricas.

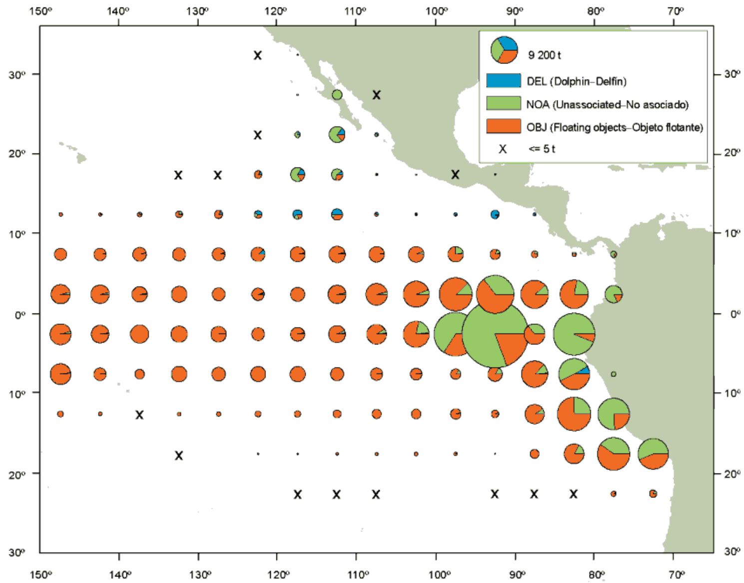

FIGURE 2a. Average annual distributions of the purse-seine catches of skipjack, by set type, 2007-2011. The sizes of the circles are proportional to the amounts of skipjack caught in those 5° by 5° areas. t = metric tons.

FIGURA 2a. Distribución media anual de las capturas cerqueras de barrilete, por tipo de lance, 2007-2011. El tamaño de cada círculo es proporcional a la cantidad de barrilete capturado en la cuadrícula de 5° x 5° correspondiente. t = toneladas métricas.

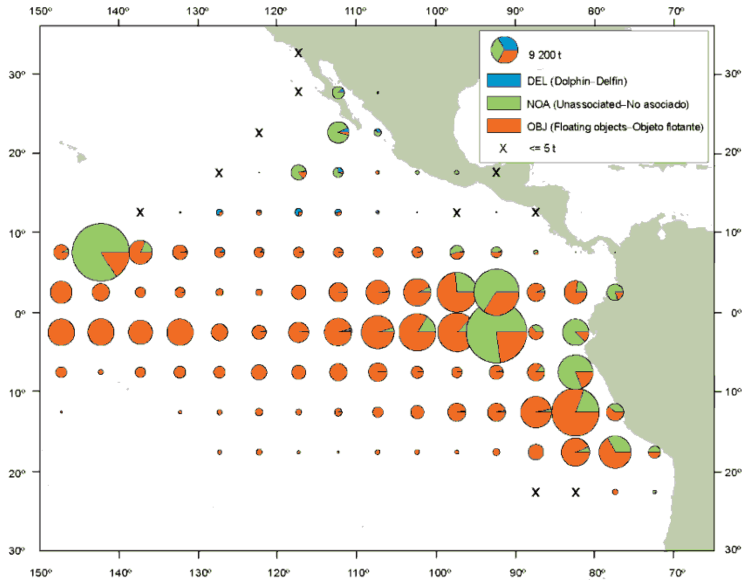

FIGURE 2b. Annual distributions of the purse-seine catches of skipjack, by set type, 2012. The sizes of the circles are proportional to the amounts of skipjack caught in those 5° by 5° areas. t = metric tons.

FIGURA 2b. Distribución anual de las capturas cerqueras de barrilete, por tipo de lance, 2012. El tamaño de cada círculo es proporcional a la cantidad de barrilete capturado en la cuadrícula de 5° x 5° correspondiente. t = toneladas métricas.

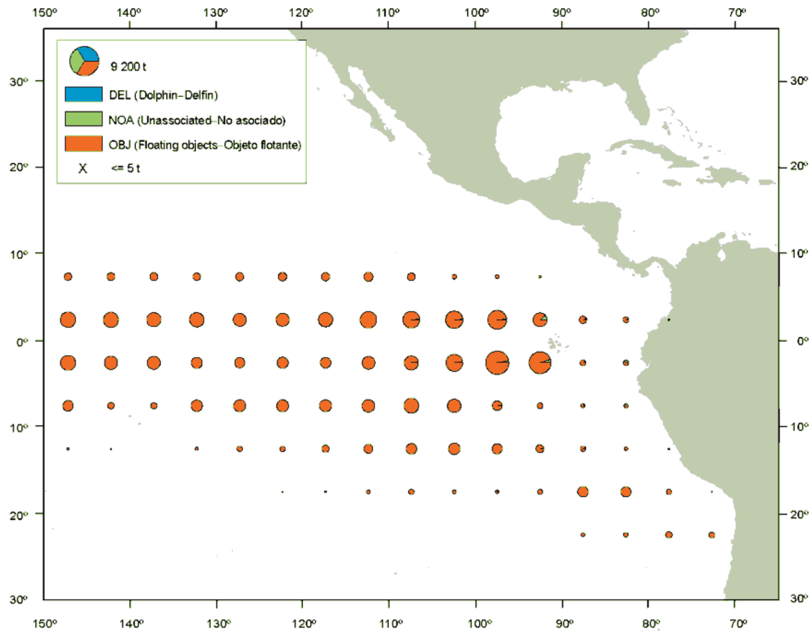

FIGURE 3a. Average annual distributions of the purse-seine catches of bigeye, by set type, 2007-2011. The sizes of the circles are proportional to the amounts of bigeye caught in those 5° by 5° areas. t = metric tons.

FIGURA 3a. Distribución media anual de las capturas cerqueras de patudo, por tipo de lance, 2007-2011. El tamaño de cada círculo es proporcional a la cantidad de patudo capturado en la cuadrícula de 5° x 5° correspondiente. t = toneladas métricas.

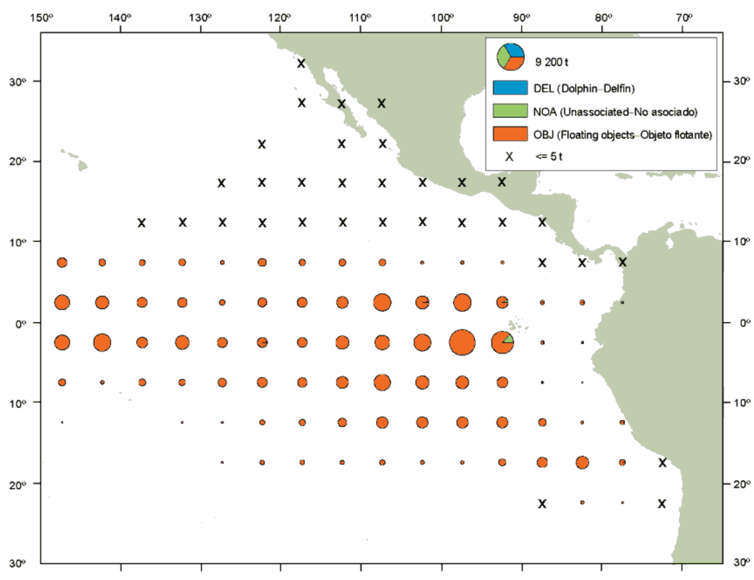

FIGURE 3b. Annual distributions of the purse-seine catches of bigeye, by set type, 2012. The sizes of the circles are proportional to the amounts of bigeye caught in those 5° by 5° areas. t = metric tons.

FIGURA 3b. Distribución anual de las capturas cerqueras de patudo, por tipo de lance, 2012. El tamaño de cada círculo es proporcional a la cantidad de patudo capturado en la cuadrícula de 5° x 5° correspondiente. t = toneladas métricas.

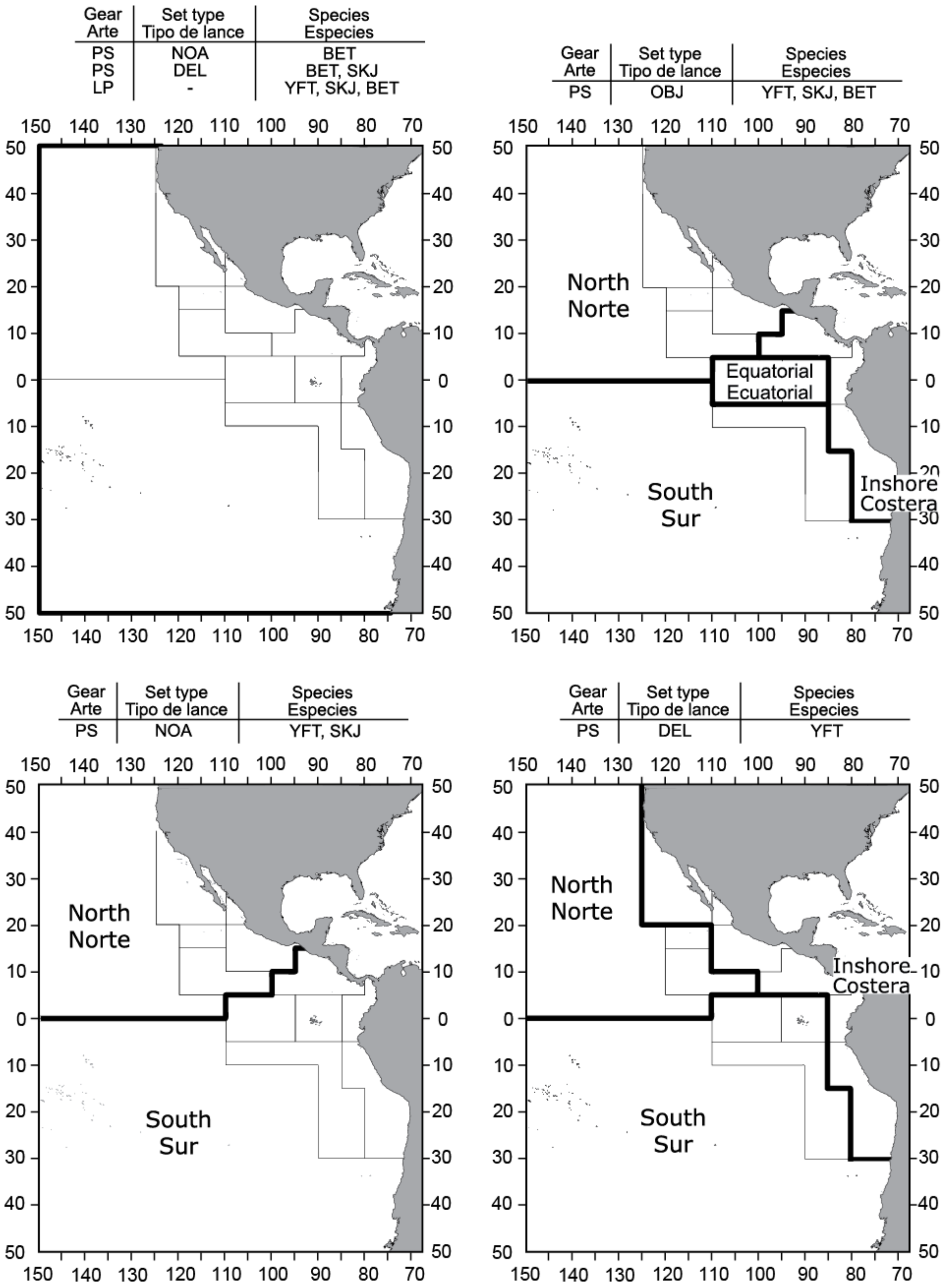

FIGURE 4. Spatial extents of the fisheries defined by the IATTC staff for stock assessment of yellowfin, skipjack, and bigeye in the EPO. The thin lines indicate the boundaries of the 13 length-frequency sampling areas, and the bold lines the boundaries of the fisheries. Gear: PS = purse seine, LP = 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.

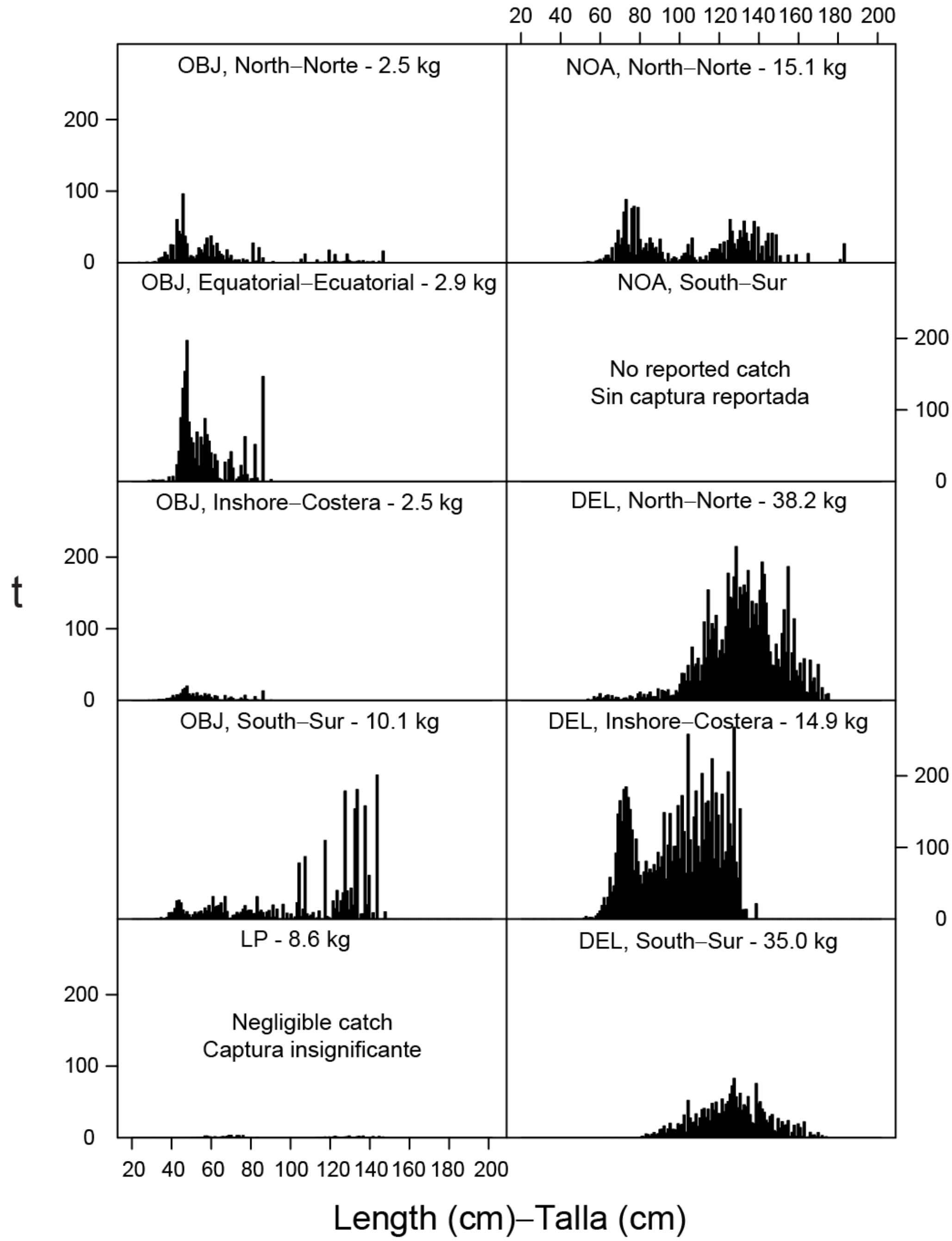

FIGURE 5a. Estimated size compositions of the yellowfin caught in each fishery of the EPO during the fourth quarter of 2012. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 5a. Composición por tallas estimada para el aleta amarilla capturado en cada pesquería del OPO durante el cuarto trimestre de 2012. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caña; NOA = peces no asociados; DEL = delfín; t = toneladas métricas.

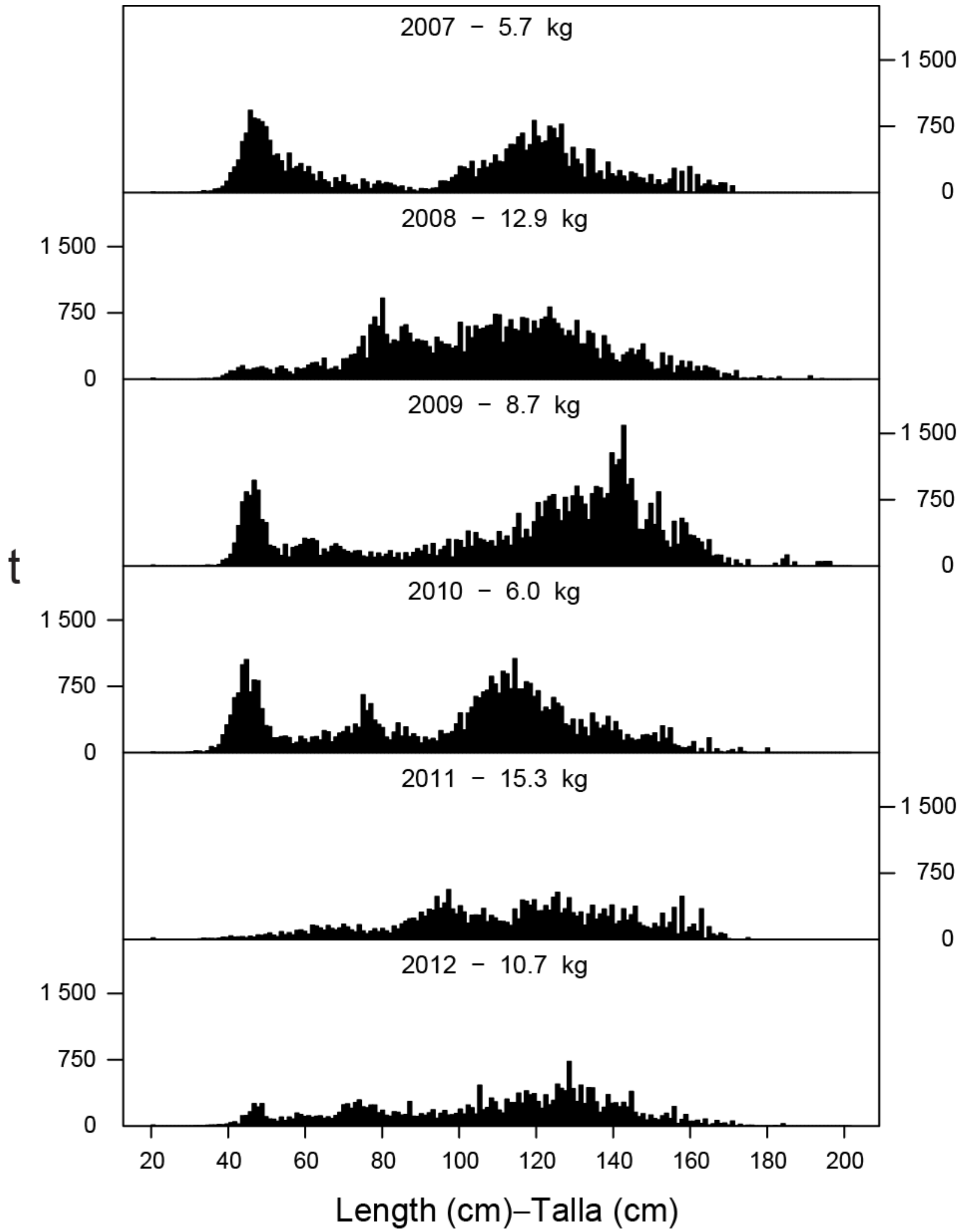

FIGURE 5b. Estimated size compositions of the yellowfin caught in the EPO during the fourth quarter of 2007-2012. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 5b. Composición por tallas estimada para el aleta amarilla capturado en el OPO en el cuarto trimestre de 2007-2012. En cada recuadro se detalla el peso promedio de los peces en las muestras; t = toneladas métricas.

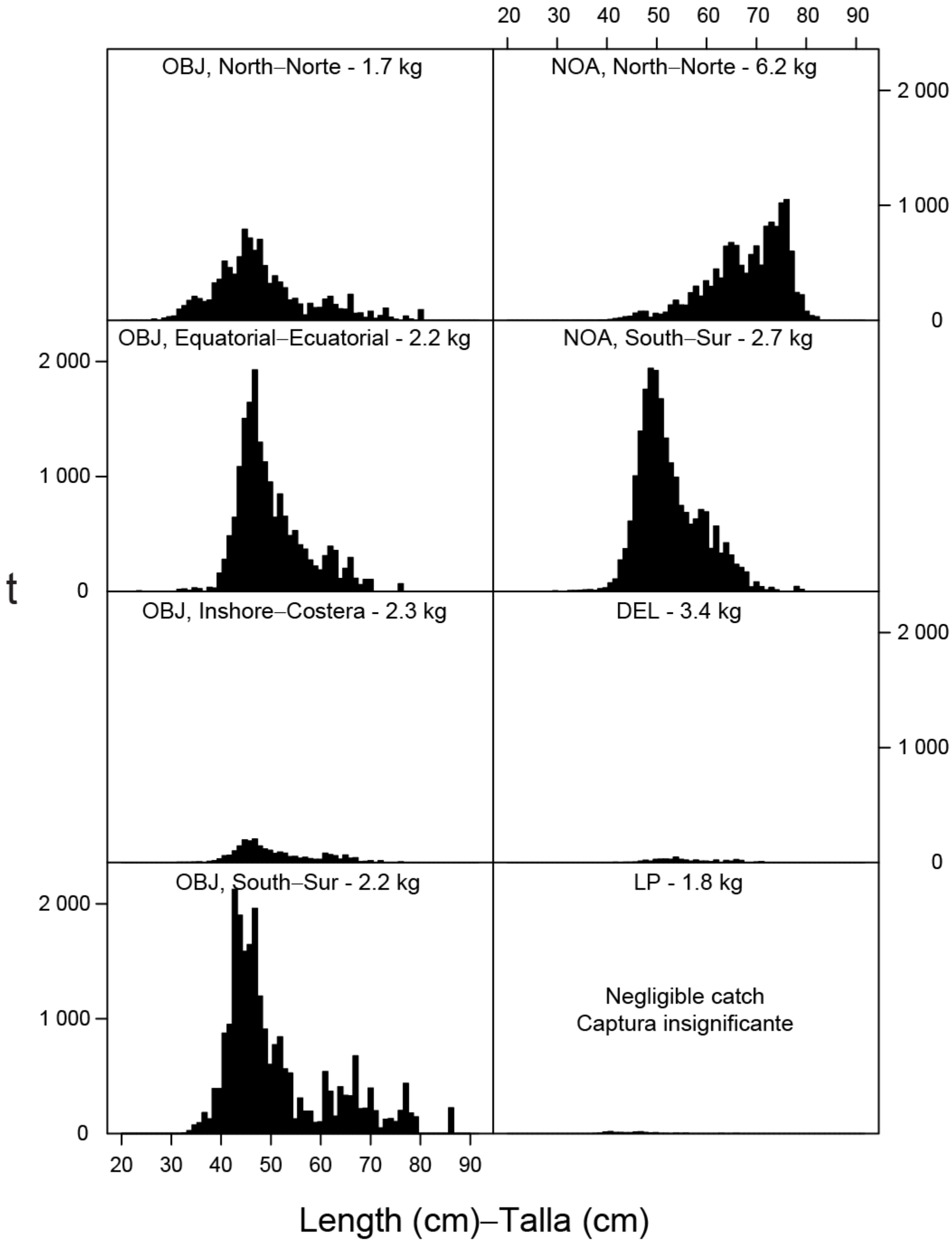

FIGURE 6a. Estimated size compositions of the skipjack caught in each fishery of the EPO during the fourth quarter of 2012. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 6a. Composición por tallas estimada para el barrilete capturado en cada pesquería del OPO durante el cuarto trimestre de 2012. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caña; NOA = peces no asociados; DEL = delfín; t = toneladas métricas.

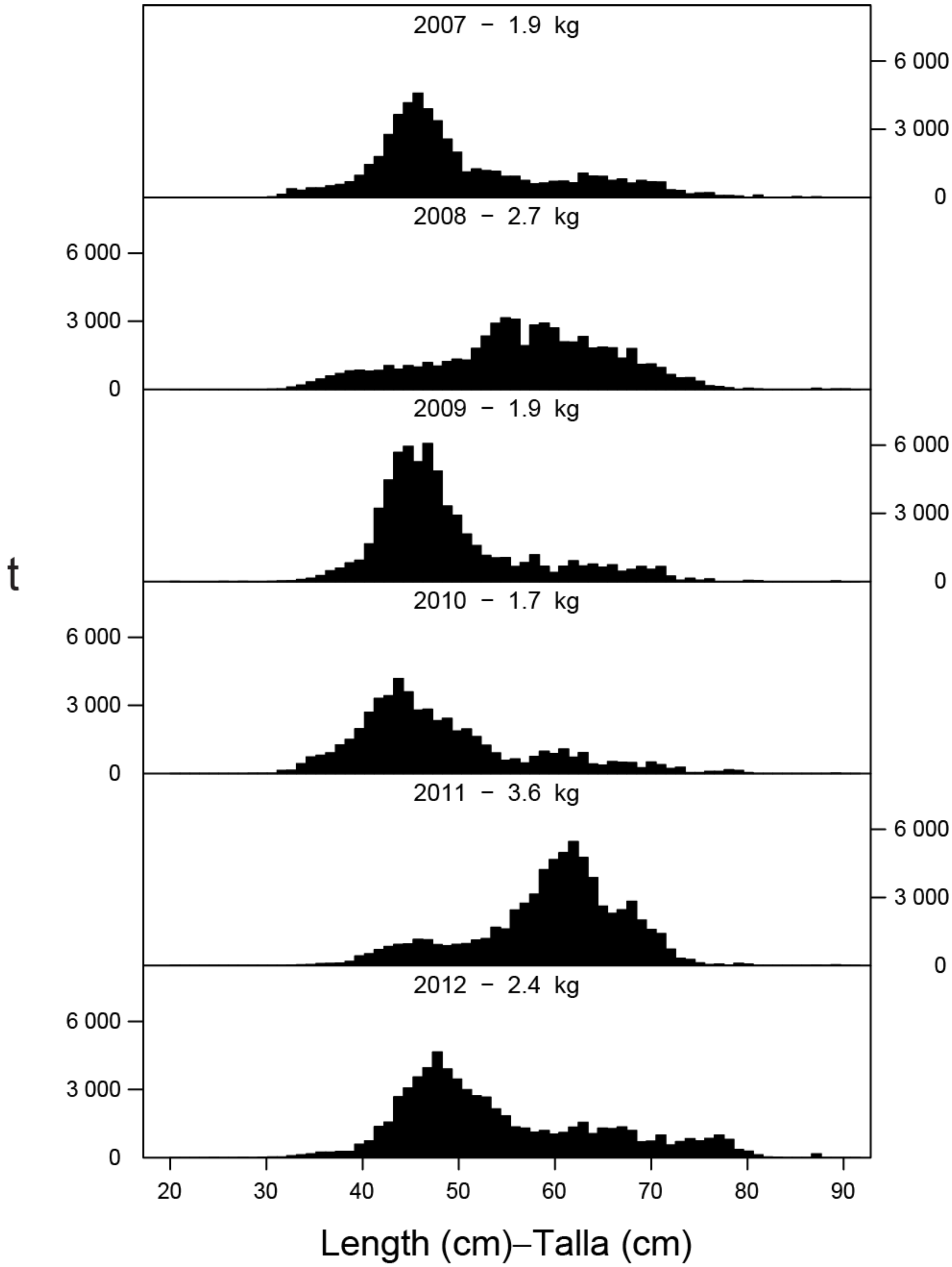

FIGURE 6b. Estimated size compositions of the skipjack caught in the EPO during the fourth quarter of 2007-2012. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 6b. Composición por tallas estimada para el barrilete capturado en el OPO en el cuarto trimestre de 2007-2012. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas.

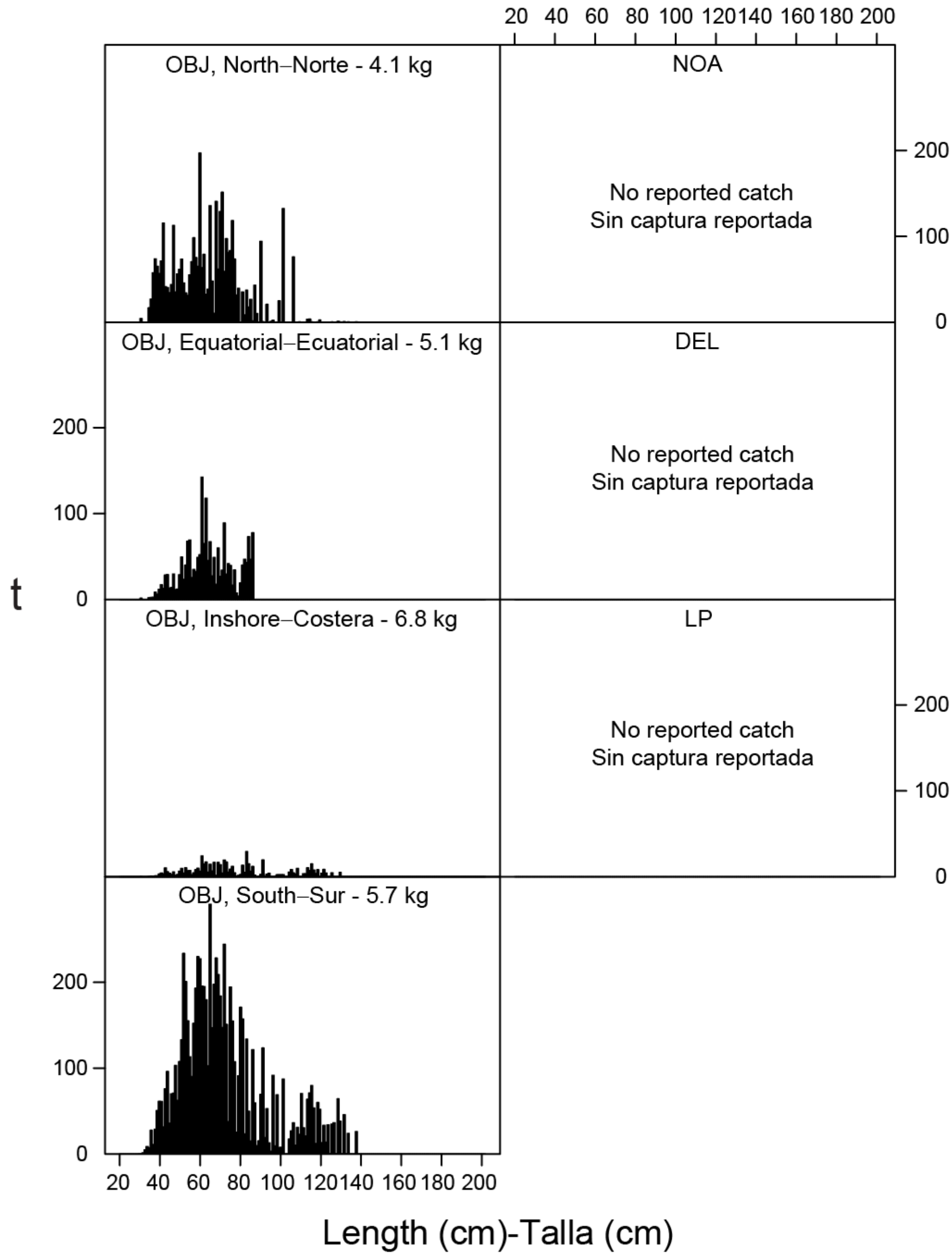

FIGURE 7a. Estimated size compositions of the bigeye caught in each fishery of the EPO during the fourth quarter of 2012. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 7a. Composición por tallas estimada para el patudo capturado en cada pesquería del OPO durante el cuarto trimestre de 2012. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caña; NOA = peces no asociados; DEL = delfín; t = toneladas métricas.

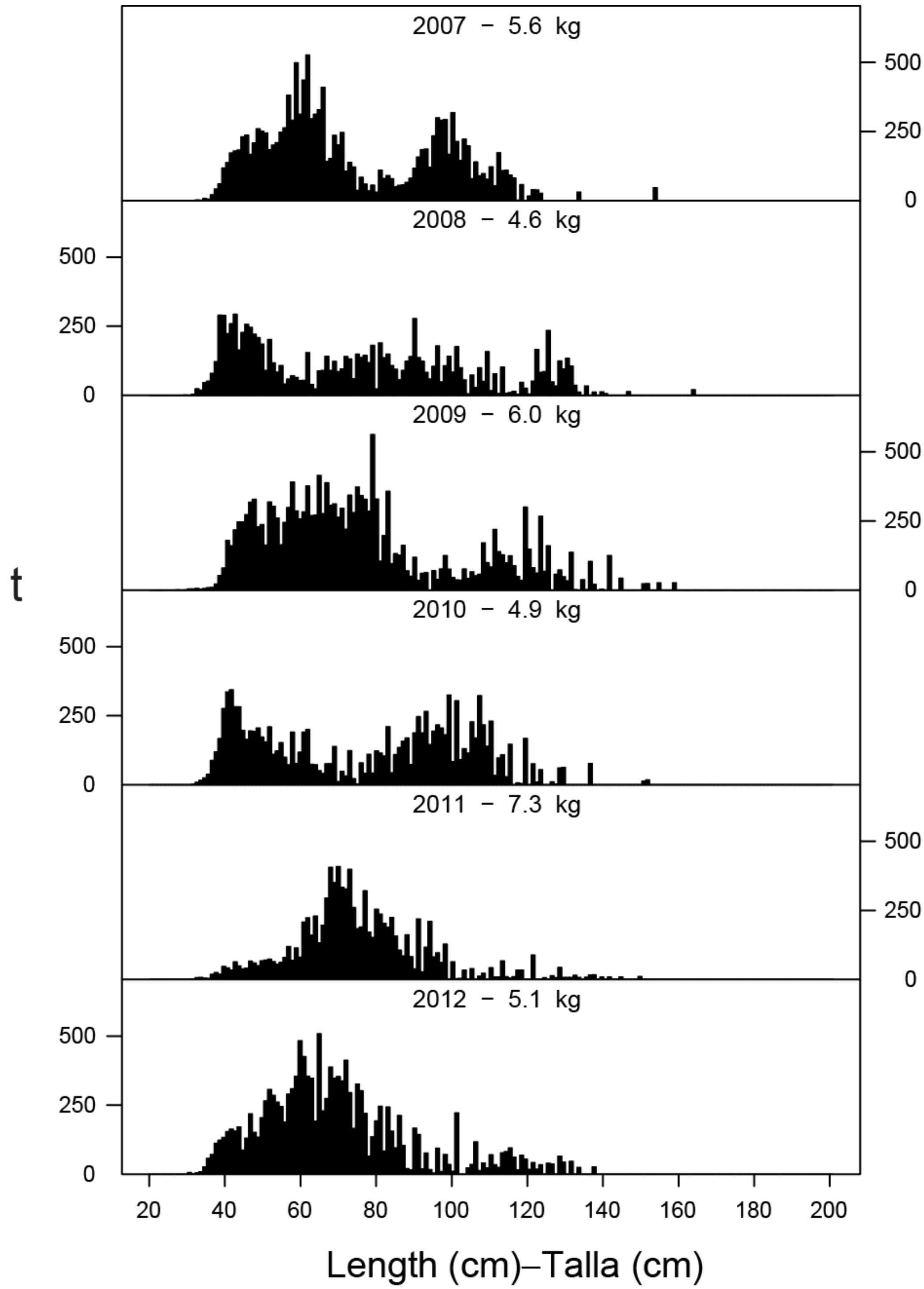

FIGURE 7b. Estimated size compositions of the bigeye caught in the EPO during the fourth quarter of 2007-2012. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 7b. Composición por tallas estimada para el patudo capturado en el OPO en el cuarto trimestre de 2007-2012. En cada recuadro se detalla el peso promedio de los peces en las muestras; t = toneladas métricas.

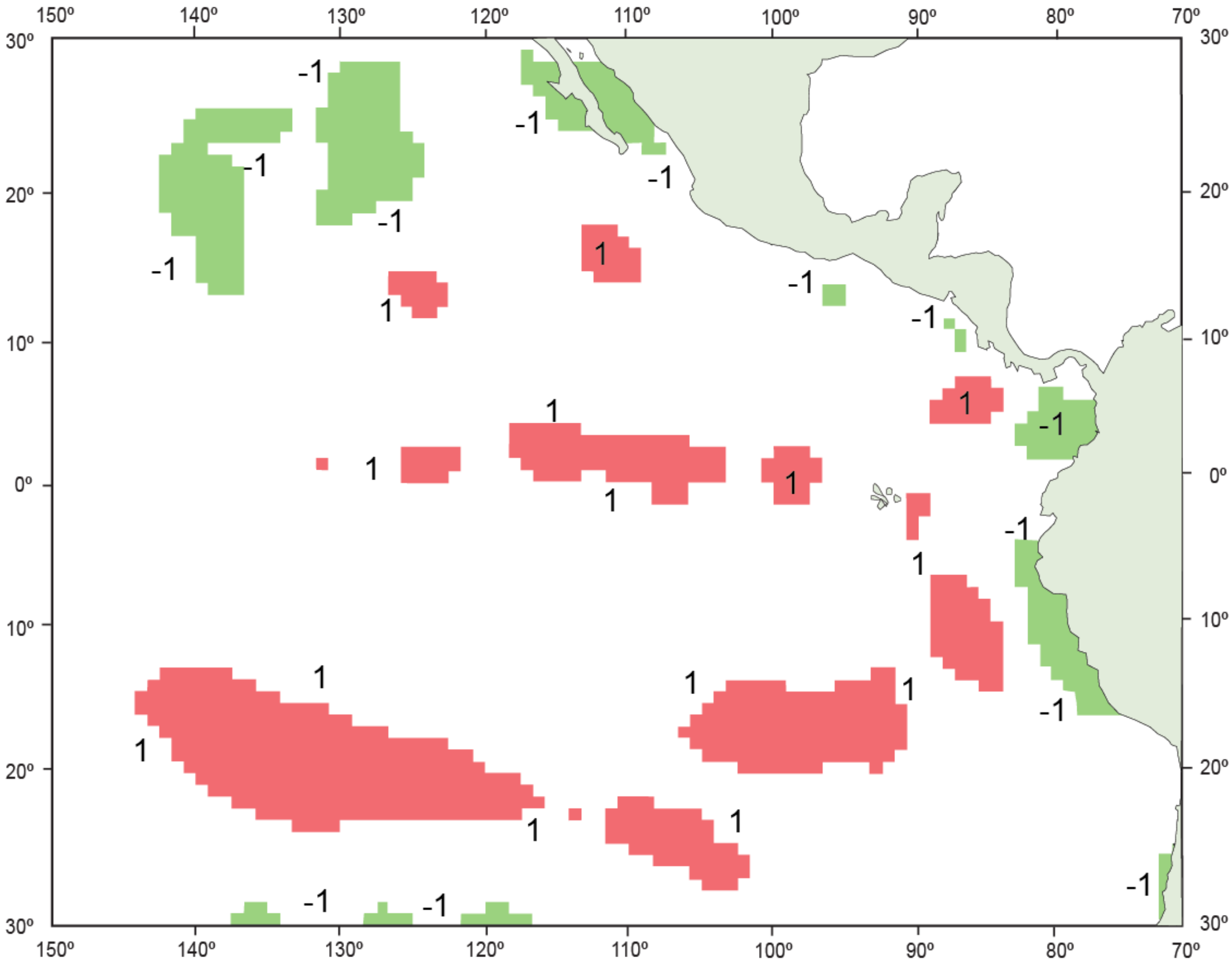

FIGURE 8. Sea-surface temperature (SST) anomalies (departures from long-term normals) for March 2013, based on data from fishing boats and other types of commercial vessels.
FIGURA 8. Anomalías (variaciones de los niveles normales a largo plazo) de la temperatura superficial del mar (TSM) en marzo de 2013, basadas en datos tomados por barcos pesqueros y otros buques comerciales.

TABLE 1. Estimates of the numbers and capacities (m³) 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, y de la capacidad de acarreo (m³) 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	73	20	11	104	80,413
UE(España)—EU(Spain)	PS	-	-	4	4	10,116
Guatemala	PS	-	1	-	1	1,475
México	PS	10	31	1	42	48,054
	LP	3	-	-	3	268
Nicaragua	PS	-	6	1	7	9,966
Panamá	PS	2	8	3	13	17,976
Perú	PS	1	-	-	1	299
El Salvador	PS	-	1	3	4	7,892
Venezuela	PS	-	15	1	16	22,300
Vanuatu	PS	-	1	-	1	1,360
All flags—	PS	90	93	24	207	
Todas banderas	LP	3	-	-	3	
	PS + LP	93	93	24	210	
			Capacity—Capacidad			
All flags—	PS	42,234	120,802	51,675	214,711	
Todas banderas	LP	268	-	-	268	
	PS + LP	42,502	120,802	51,675	214,979	

TABLE 2. Preliminary estimates of the retained catches of tunas in the EPO, from 1 January through 31 March 2013, 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 31 de marzo 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**
Ecuador	4,643	43,764	6,236	-	12	-	-	4	54,659	39.2
México	30,924	3,706	17	-	-	-	707	-	35,354	25.3
Nicaragua	1,400	525	215	-	-	-	-	-	2,140	1.5
Panamá	5,308	10,121	1,053	-	-	-	-	-	16,482	11.8
Venezuela	5,868	8,184	14	-	-	-	-	-	14,066	10.1
Other—Otros[2]	3,683	12,313	862	-	-	-	-	-	16,858	12.1
Total	51,826	78,613	8,397	-	12	-	707	4	139,559	

[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 and Vanuatu; this category is used to avoid revealing the operations of individual vessels or companies.
[2] Incluye Colombia, El Salvador, Guatemala, Unión Europea (España) y Vanuatú; 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. "Other" includes other tunas, sharks, and miscellaneous fishes. The data for 2011-2012 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. "Otros" incluye otros atunes, tiburones, y peces diversos. Los datos de 2011-2012 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
1983	87,936	-	87,936	61,238	-	61,238	4,614	-	4,614	836	-	836
1984	138,776	-	138,776	62,743	-	62,743	8,863	-	8,863	839	-	839
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	4,758	229,201	87,602	10,599	98,201	9,657	653	10,310	580	0	580
1994	212,033	4,527	216,560	73,366	10,504	83,870	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	24,503	131,031	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	4,698	263,742	142,315	22,644	164,959	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	24,508	230,386	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	5,950	389,699	274,606	22,453	297,059	53,052	2,326	55,378	3,236	0	3,236
2004	274,441	3,009	277,450	198,354	17,182	215,536	65,471	1,749	67,220	8,880	19	8,899
2005	269,923	2,929	272,852	264,528	17,228	281,756	67,895	1,952	69,847	4,743	15	4,758
2006	167,317	1,665	168,982	296,703	12,403	309,106	83,838	2,385	86,223	9,928	0	9,928
2007	170,910	1,947	172,857	208,571	7,159	215,730	63,450	1,039	64,489	4,189	0	4,189
2008	185,869	1,019	186,888	297,104	9,166	306,270	75,028	2,287	77,315	4,407	14	4,421
2009	237,481	1,482	238,963	230,674	6,903	237,577	76,799	1,104	77,903	3,428	24	3,452
2010	251,469	1,145	252,614	147,239	3,419	150,658	57,752	653	58,405	7,746	0	7,746
2011	201,967	564	202,531	280,405	6,087	286,492	57,190	730	57,920	2,829	4	2,833
2012	190,224	583	190,807	271,259	3,948	275,207	68,598	773	69,371	6,705	0	6,705

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

Year	Albacore			Bonitos (*Sarda* spp.)			Black skipjack			Other			Total		
	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Año	Albacora			Bonitos (*Sarda* spp.)			Barrilete negro			Otros			Total		
	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total
1983	456	-	456	3,829	-	3,829	1,222	-	1,222	60	-	60	160,191	-	160,191
1984	5,351	-	5,351	3,514	-	3,514	662	-	662	6	-	6	220,754	-	220,754
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	4,144	4,248	9	2,014	2,023	322,996	22,180	345,176
1994	85	-	85	8,693	147	8,840	188	857	1,045	9	498	507	330,242	18,799	349,041
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	39,837	459,856
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	33,277	482,538
1999	274	-	274	1,719	-	1,719	171	3,412	3,583	27	3,092	3,119	603,219	44,083	647,302
2000	157	-	157	636	-	636	293	1,995	2,288	190	1,410	1,600	561,903	39,537	601,440
2001	160	-	160	17	-	17	2,258	1,019	3,277	191	679	870	595,765	22,798	618,563
2002	412	-	412	-	-	-	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	33,502	748,758
2004	231	-	231	16	35	51	884	387	1,271	256	973	1,229	548,533	23,354	571,887
2005	68	-	68	313	18	331	1,472	2,124	3,596	190	1,922	2,112	609,132	26,188	635,320
2006	110	-	110	3,519	80	3,599	1,999	1,972	3,971	50	1,910	1,960	563,464	20,415	583,879
2007	208	-	208	16,013	628	16,641	2,306	1,625	3,931	598	1,221	1,819	466,245	13,619	479,864
2008	1,099	-	1,099	7,883	37	7,920	3,624	2,251	5,875	137	1,380	1,517	575,151	16,154	591,305
2009	2,277	2	2,279	10,053	15	10,068	4,362	1,020	5,382	162	469	631	565,236	11,019	576,255
2010	25	-	25	2,824	19	2,843	3,425	1,079	4,504	136	709	845	470,616	7,024	477,640
2011	51	-	51	7,987	29	8,016	2,317	719	3,036	108	784	892	552,854	8,917	561,771
2012	*	-	*	8,187	-	8,187	4,379	440	4,819	41	354	395	549,393	6,098	555,491

TABLE 4. Preliminary estimates of the retained catches in metric tons, of tunas and bonitos caught by purse-seine, pole-and-line, and recreational vessels in the EPO in 2011 and 2012, 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, cañeros, y recreacionales en el OPO en 2011 y 2012, 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**
2011					**Retained catches—Capturas retenidas**					
Colombia	18,384	23,746	2,993	-	10	-	-	-	45,133	8.2
Ecuador	25,923	154,814	33,007	-	-	186	3	40	213,973	38.7
EU (España)	1,077	5,442	3,902	-	-	-	-	-	10,421	1.9
México	102,887	8,600	635	2,730	-	2,023	7,984	43	124,902	22.6
Nicaragua	7,774	4,021	2,131	-	-	-	-	-	13,926	2.5
Panamá	18,410	30,549	7,438	-	-	-	-	-	56,397	10.2
Venezuela	18,344	27,417	279	-	-	39	-	10	46,089	8.3
Other-Otra[1]	9,168	25,816	6,805	99	41	69	-	15	42,013	7.6
Total	201,967	280,405	57,190	2,829	51	2,317	7,987	108	552,854	
2012					**Retained catches–Capturas retenidas**					
Colombia	19,620	16,662	2,275	-	-	-	-	-	38,557	7.0
Ecuador	23,029	159,008	43,582	-	-	752	3,837	38	230,246	41.9
EU (España)	958	15,077	4,455	-	-	5	-	-	20,495	3.7
México	97,086	14,713	730	6,667	-	3,614	4,325	-	127,135	23.1
Nicaragua	7,038	4,077	1,596	-	-	-	-	-	12,711	2.3
Panamá	14,290	25,734	8,896	-	-	-	25	-	48,945	8.9
Venezuela	22,689	21,335	1,044	-	-	7	-	2	45,077	8.2
Other-Otra[2]	5,514	14,653	6,020	38	-	1	-	1	26,227	4.8
Total	190,224	271,259	68,598	6,705	-	4,379	8,187	41	549,393	

[1] Includes Bolivia,, El Salvador, Guatemala, Honduras, United States, and Vanuatu This category is used to avoid revealing the operations of individual vessels or companies.

[1] Incluye Bolivia,, El Salvador, Estados Unidos, Guatemala, Honduras, y Vanuatú Se usa esta categoría para no revelar información sobre las actividades de buques o empresas individuales.

[2] Includes El Salvador, Guatemala, United States, and Vanuatu This category is used to avoid revealing the operations of individual vessels or companies.

[2] Incluye El Salvador, Estados Unidos, Guatemala, y Vanuatú 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 2012 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 2012 por buques palangreros de más de 24 metros en eslora total.

Flag—Bandera	Quarter—Trimestre				Total
	1	2	3	4	
China	1,621	714	1,052	1,001	4,388
Japan—Japón	3,584	2,728	2,980	3,691	12,983
Republic of Korea—República de Corea*	1,575	505	1,203	3,609	6,892
Chinese Taipei—Taipei Chino	862	820	1,255	1,931	4,868
United States—Estados Unidos	-	-	-	-	-
Vanuatu	195	29	-	-	224
Total	7,837	4,796	6,490	10,232	29,355

* 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 2013 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 2013 por buques palangreros de más de 24 metros en eslora total.

Flag—Bandera	Month—Mes			Total
	1	2	3	
China	561	379	339	1,279
Japan—Japón	-	-	-	-
Republic of Korea—República de Corea*	1,461	738	-	2,199
Chinese Taipei—Taipei Chino	-	-	-	-
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 2012-March 2013. 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 2012-marzo 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	**4**	**5**	**6**	**7**	**8**	**9**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	26.9 (1.3)	25.5 (1.2)	24.5 (1.6	22.8 (1.2)	21.0 (0.4)	20.8 (0.5)
Area 2 (5°N-5°S, 90°-150°W	27.6 (0.1)	27.2 (0.2)	27.1 (0.7)	26.6 (1.0)	25.7 (0.7)	25.3 (0.4)
Area 3 (5°N-5°S, 120°-170°W)	27.4 (-0.4)	27.8 (-0.1)	28.0 (0.3)	27.8 (0.6)	27.6 (0.7)	27.2 (0.5)
Area 4 (5°N-5°S, 150W°-160°E)	28.2 (-0.3)	28.5 (-0.3)	28.7 (-0.1)	28.8 (0.0)	29.1 (0.4)	29.1 (0.4)
Thermocline depth—Profundidad de la termoclina, 0°, 80°W	10	15	35	25	30	40
Thermocline depth—Profundidad de la termoclina, 0°, 110°W	40	90	80	80	45	65
Thermocline depth—Profundidad de la termoclina, 0°, 150°W	130	130	125	140	140	140
Thermocline depth—Profundidad de la termoclina, 0°, 180°W	195	180	190	175	175	170
SOI—IOS	-0.3	0.0	-0.4	0.0	-0.2	0.2
SOI*—IOS*	2.98	-3.19	-1.36	5.60	2.99	2.28
NOI*—ION*	-1.34	2.67	0.17	1.87	-1.32	2.83

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)	20.7 (-0.1)	21.2 (-0.4)	22.0 (-0.9)	24.0 (-0.5)	25.7 (-0.4)	26.7 (0.1)
Area 2 (5°N-5°S, 90°-150°W	24.9 (0.0)	25.1 (0.1)	24.9 (-0.2)	25.1 (-0.6)	25.9 (-0.5)	27.2 (0.1)
Area 3 (5°N-5°S, 120°-170°W)	27.0 (0.3)	27.0 (0.4)	26.5 (-0.1)	26,2 (-0.4)	26.3 (-0.4)	27.0 (-0.2)
Area 4 (5°N-5°S, 150W°-160°E)	29.2 (0.5)	29.2 (0.5)	28.7 (0.3)	28.3 (0.0)	28.1 (0.0)	28.0 (-0.2)
Thermocline depth—Profundidad de la termoclina, 0°, 80°W	35	30	35	20	20	10
Thermocline depth—Profundidad de la termoclina, 0°, 110°W	100	100	100	20	25	75
Thermocline depth—Profundidad de la termoclina, 0°, 150°W	150	150	150	125	130	120
Thermocline depth—Profundidad de la termoclina, 0°, 180°W	175	165	180	175	175	180
SOI—IOS	0.3	0.3	-0.6	-0.1	-0.2	1.5
SOI*—IOS*	1.08	-0.23	1.51	0.52	-1.89	1.52
NOI*—ION*	-0.19	-2.34	0.02	6.64	8.00	2.06

TABLE 7. Preliminary data on the sampling coverage of trips by Class-6 vessels (vessels with fish-carrying capacities greater than 363 metric tons) 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 first quarter of 2013. The numbers in parentheses indicate cumulative totals for the year.
TABLA 7. Datos preliminares de la cobertura de muestreo de viajes de buque de Clase 6 (buques con capacidad de acarreo mayor a 363 toneladas métricas) que pescaron en el OPO) 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 2013. Los números entre paréntesis indican los totales acumulados para el año.

Flag	Trips		Observed by program						Percent observed	
			IATTC		National		Total			
Bandera	Viajes		Observado por programa						Porcentaje observado	
			CIAT		Nacional		Total			
Colombia	18	(18)	8	(8)	10	(10)	18	(18)	100.0	(100)
Ecuador	100	(100)	64	(64)	36	(36)	100	(100)	100.0	(100)
El Salvador	4	(4)	4	(4)			4	(4)	100.0	(100)
España—Spain	10	(10)	5	(5)	5	(5)	10	(10)	100.0	(100)
Guatemala	1	(1)	1	(1)			1	(1)	100.0	(100)
México	62	(62)	33	(33)	29	(29)	62	(62)	100.0	(100)
Nicaragua	6	(6)	3	(3)	3	(3)	6	(6)	100.0	(100)
Panamá	20	(20)	9	(9)	11	(11)	20	(20)	100.0	(100)
United States—EE.UU.	1	(3)	0	(2)	1	(1)	1	(3)	100.0	(100)
Vanuatu	1	(1)	1	(1)			1	(1)	100.0	(100)
Venezuela	23	(23)	12	(12)	11	(11)	23	(23)	100.0	(100)
Total	245	(245)	140	(140)	105	(105)	245	(245)	100.0	(100)