INTER-AMERICAN TROPICAL TUNA COMMMISSION

COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

QUARTERLY REPORT—INFORME TRIMESTRAL

July-September 2011—Julio-Septiembre 2011

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

El Informe Trimestral de la Comisión Interamericana del Atún Tropical es un relato informal de la situación actual de la pesca atunera en el Océano Pacífico oriental con relación a los intereses de la Comisión, y de la investigación científica y demás actividades del personal científico de la Comisión. Gran parte de los resultados de investigación presentados en este informe son preliminares y deben ser considerados como informes del avance de la investigación.

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INTRODUCTION

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

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 61st year. The results of the IATTC staff's research are published in the IATTC's Bulletin and Stock Assessment Report series in English and Spanish, its two official languages, in its Special Report and Data Report series, and in books, outside scientific journals, and trade journals. Summaries of each year's activities are reported upon in the IATTC's Annual Reports and Fishery Status Reports, also in the two languages.

MEETINGS

IATTC meetings

The second meeting of the IATTC Committee for the Review of Implementation of Measures Adopted by the Commission was held in La Jolla, California, USA, on 29-30 June 2011.

The 11th meeting of the IATTC Working Group on Finance was held on in La Jolla, California, USA, on 1 July 2011.

The 82nd ordinary meeting of the IATTC was held in La Jolla, California, USA, on 4-8 July 2011. The following resolutions were adopted at that meeting:

- C-11-01 Resolution on a Multiannual Program for the Conservation of Tuna in the Eastern Pacific Ocean in 2011-2013;
- C-11-02 Resolution to Mitigate the Impact on Seabirds of Fishing for Species Covered by the IATTC;
- C-11-03 Resolution Prohibiting Fishing on Data Buoys;

C-11-04 Financing for Fiscal Year 2012;

C-11-05 Resolution (Amended) on the Establishment of a List of Longline Fishing Vessels over 24 Meters (LSTLFVs) Authorized to Operate in the Eastern Pacific Ocean;

C-11-06 Resolution (Amended) on a Regional Vessel Register;

C-11-07 Resolution on the Process For Improved Compliance of Resolutions Adopted by the Commission;

C-11-08 Resolution on Scientific Observers for Longline Vessels;

C-11-09 Resolution (Amended) on Establishing a Program for Transhipments by Large-Scale Fishing Vessels;

C-11-10 Resolution on the Conservation of Oceanic Whitetip Sharks Caught in Association with Fisheries in the Antigua Convention Area;

C-11-11 Resolution on the Creation of the Special Sustainable Development Fund for Fisheries for Highly Migratory Species to Strengthen the Institutional Capacity of Developing Countries;

C-11-12 Resolution on the Carrying Capacity of Peru.

Other meetings

Dr. Michael G. Hinton participated in the ninth meeting of the Indian Ocean Tuna Commission Working Party on Billfish in Victoria, Mahé, Seychelles, on 4-8 July 2011.

Drs. Guillermo A. Compeán, Jean-François Pulvenis de Séligny, Mark N. Maunder, and Martín A. Hall participated in the Third Joint Meeting of the Tuna Regional Fisheries Management Organizations ("the Kobe III meeting"), which was held in La Jolla, California, USA, on 11-15 July 2011.

An Informal Workshop on Matters Related to the IATTC and WCPFC [Western and Central Pacific Fisheries Commission] was held on 11 July 2011 during the Kobe III meeting. A Memorandum of Cooperation (MOC) on the Cross-Endorsement of WCPFC and IATTC Approved Observers on the High Seas of the Convention Areas of Both Organizations was adopted at that workshop. If a vessel with an observer from one organization transfers its operations into an area under the jurisdiction of the other organization the observer will continue to keep records, and copies of those records will go to both organizations.

Dr. Mark N. Maunder participated in a meeting entitled "Evaluating and Improving Open Source Software for Nonlinear Statistical Modeling in Ecology" at the National Center for Ecological Analysis and Synthesis at the University of California at Santa Barbara on 18-22 July 2011. Dr. Maunder is co-principal investigator and chairman of the working group.

Mr. Kurt M. Schaefer participated at the Seventh Scientific Committee meeting of the Western and Central Pacific Fisheries Commission in Pohnpei, Federated States of Micronesia, during the period of 9-17 August 2011. He gave the following presentations at the meeting:

"An Overview of the EPO Tuna Fisheries through the 2010 Fishing Year, along with the Stock Assessments by IATTC Staff for YFT, SKJ, and BET";

"An Overview of the 2011 ISSF/IATTC Research Cruise in the Equatorial EPO for Investigating Potential Solutions for Reducing Fishing Mortality on Undesirable Sizes of Bigeye and Yellowfin Tunas, and Sharks, in Purse-Seine Sets on Drifting FADs."

Mr. Schaefer also participated in the Fifth Steering Committee meeting for the Pacific Tuna Tagging Program, and at that time presented an overview of the analyses of the bigeye tuna archival tag data analyses from tag deployments in the central Pacific Ocean during 2008 and 2009. Most of the documents presented at the meeting can be seen on the following web site: http://www.wcpfc.int/meetings/2011/7th-regular-session-scientific-committee.

Drs. Martín A. Hall and Mark N. Maunder participated in a dolphin workshop at Scripps Institution of Oceanography, La Jolla, California, USA, on 19-28 August 2011. Dr. Maunder gave a presentation entitled "Dolphin Population Dynamics Modeling at the IATTC."

Dr. Michael G. Hinton participated in the Fifth International Symposium on Fishery GIS/Spatial Analyses in Fishery and Aquatic Sciences in Wellington, New Zealand, on 22-26 August 2011. (GIS stands for geographic information system.) The symposium, which is held triennially, is sponsored by the International Fishery GIS Society [http://www.esl.co.jp/Sympo/index.htm]. Dr. Hinton's participation was partially funded through a grant provided by the U.S. National Aeronautics and Space Administration [http://www.nasa.gov/] for development of the Pelagic Habitat Analysis Module [http://phamlite.com/], a decision support tool that delivers oceanographic and satellite-derived products and data to fisheries scientists.

Dr. Guillermo Compeán participated in the Córdoba Tuna Allocation Conference, sponsored by the International Seafood Sustainability Foundation (ISSF), in Córdoba, Spain, on 4-8 September 2011, where he gave a presentation entitled, "Recent Issues in the Eastern Pacific Ocean (EPO)." This conference was a continuation of the ISSF's conference held in Bellagio, Italy, in May 2010 and its workshop on Allocation of Common Resources, held at Yountville, California, USA, on 11-13 February 2011. His travel expenses were paid by the ISSF.

Dr. Robert J. Olson and Mr. Vernon P. Scholey participated in the 141st Annual Meeting of the American Fisheries Society, which took place in Seattle, Washington, USA, on 4-8 September 2011. Dr. Olson was an invited participant in a symposium entitled "Comparative Analysis of Marine Fisheries and Ecosystems, at which he gave a presentation entitled, "Decadal-scale Comparisons of Predation by a Generalist Pelagic Predator: Ecosystem Implications in the Eastern Tropical Pacific Ocean." The presentation was co-authored with Drs. Felipe Galván-Magaña, Petra Kuhnert, and Noemi Bocanegra-Castillo and Mss. Leanne M. Duffy and Vanessa Alatorre-Ramírez. Mr. Scholey presented a paper, co-authored with Dr. Daniel Margulies and Mss. Jeanne B. Wexler, and Maria C. Santiago, entitled "Tuna Research Activities at the Inter-American Tropical Tuna Commission Achotines Laboratory."

RESEARCH

DATA COLLECTION AND DATABASE PROGRAM

The IATTC had field offices at Las Playas and Manta, Ecuador; Manzanillo and Mazatlan, Mexico; Panama, Republic of Panama; and Cumaná, Venezuela, during the third quarter of 2011. Personnel at these offices collected 393 length-frequency samples from 246 wells and abstracted logbook information for 331 trips of commercial fishing vessels during the quarter.

Reported fisheries statistics

The information reported herein are for the eastern Pacific Ocean (EPO: the region east of 150ºW, south of 50ºN, and north of 50°S), unless noted otherwise. The catches are reported in metric tons (t), the vessel capacities in cubic meters (m^3), and effort in days fishing. Estimates of fisheries statistics with varying degrees of accuracy and precision are available. The most accurate and precise are those made after all available information has been entered into the data base, processed, and verified. While it may require a year or more to obtain some final information, much of the catch information is processed and available within two to three months of the return of a vessel from a fishing trip. Thus the estimates for the current week are the most preliminary, while those made a year later are much more accurate and precise. The statistics are developed using data from many sources, including reports of landings, fishing vessel logbooks, scientific observers, and governmental agencies.

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

The IATTC Regional Vessel Register lists all vessels, other than artisanal and recreational fishing vessels, authorized to fish for tunas in the EPO. 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 2011 is about 213,900 m^3 (Table 1). The average weekly at-sea capacity for the fleet, for the weeks ending 27 June through 2 October, was about 125,600 m^3 (range: 98,600 to 163,900 m^3).

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

Catch statistics

The estimated total retained catches, in metric tons, of tropical tunas from the EPO during the period of January-September 2011, and the equivalent statistics for 2006-2010, were:

Species	2011	2006-2010			Weekly average,
		Average	Minimum	Maximum	2011
Yellowfin	178,100	163,300	142,400	187,200	4,600
Skipjack	210,500	175,200	118,500	234,600	5,400
Bigeye	37,800	41,500	35,900	48,000	1,000

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

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

The catch-per-unit-of-effort (CPUE) statistics in this report do not incorporate adjustments for factors, such as type of set, vessel operating costs, or market prices, which might identify whether a vessel was directing its effort toward a specific species.

The measures of CPUE used in these analyses are based on data from fishing trips landing predominantly yellowfin, skipjack, bigeye, and bluefin tuna. The great majority of the purse-seine catches of yellowfin, skipjack, and bigeye are made by vessels with fish-carrying capacities greater than 363 metric tons, and only data for these vessels are included in these analyses. There are now far fewer pole-and-line vessels than in previous years, so the data for these vessels are combined without regard to their fish-carrying capacities.

The estimated nominal catches of yellowfin, skipjack, and bigeye per day of fishing, in metric tons, by purse-seine (PS) and pole-and-line (LP) gear in the EPO during the first two quarters of 2011 and comparative statistics for 2006-2010 were:

Region	Species	Gear	2011	2006-20010		
				Average	Minimum	Maximum
N of 5°N	yellowfin	PS	13.6	11.5	9.3	14.1
S of 5°N			4.1	2.6	2.2	3.1
N of 5°N	skipjack	PS	1.5	1.9	0.6	3.2
S of 5°N			12.3	8.5	6.4	11.6
EPO	bigeye	PS	1.6	2.2	1.9	3.1
EPO	yellowfin	LP	2.5	0.8	0.0	1.6
EPO	skipjack	LP	0.1	0.3	0.0	0.9

Catch statistics for the longline fishery

IATTC Resolution C-09-01 requires nations whose annual catches of bigeye by longline gear in the EPO exceed 500 metric tons to report their catches at monthly intervals. The catches reported for January-September 2011 are shown in Table 3.

Size compositions of the surface catches of tunas

Length-frequency samples are the basic source of data used for estimating the size and age compositions of the various species of fish in the landings. This information is necessary to obtain age-structured estimates of the population. Samples of yellowfin, skipjack, bigeye, Pacific bluefin, and, occasionally, black skipjack from the catches of purse-seine, pole-and-line, and recreational vessels in the EPO are collected by IATTC personnel at ports of landing in Ecuador, Mexico, Panama, the USA, and Venezuela. The catches of yellowfin and skipjack were first sampled in 1954, bluefin in 1973, and bigeye in 1975.

The methods for sampling the catches of tunas are described in the IATTC Annual Report for 2000 and in IATTC Stock Assessment Report 4. Briefly, the fish in a well of a purse-seine or pole-and-line vessel are selected for sampling only if all the fish in the well were caught during the same calendar month, in the same type of set (floating-object, unassociated school, or dolphin), and in the same sampling area. These data are then categorized by fishery (Figure 1).

Data for fish caught during the second quarters of 2006-2011 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 second quarter of 2011, and the second shows data for the combined strata for the second quarter of each year of the 2006-2011 period. Samples from 260 wells were taken during the second quarter of 2011.

There are ten surface fisheries for yellowfin defined for stock assessments, four associated with floating objects, two unassociated school, three associated with dolphins, and one pole-and-line (Figure 1). The last fishery includes all 13 sampling areas. Of the 260 wells sampled that contained fish caught during the second quarter of 2011, 184 contained yellowfin. The estimated size compositions of these fish are shown in Figure 2a. The majority of the yellowfin catch during the second quarter was taken by sets on dolphins in the Northern and Inshore areas. There were also lesser amounts of yellowfin taken in schools associated with dolphins in the Southern area. Small amounts of yellowfin were taken in floating-object sets, in the Northern, Equatorial, Inshore, and Southern areas, and in sets on unassociated schools in the Northern and Southern areas.

The estimated size compositions of the yellowfin caught by all fisheries combined during the second quarters of 2006-2011 are shown in Figure 2b. The average weight of the yellowfin caught during the second quarter of 2011 (10.8 kg) was slightly less than that of 2010 (10.9 kg), but considerably less than that of 2009 (18.5 kg).

There are eight fisheries for skipjack defined for stock assessments, four associated with floating objects, two unassociated school, one associated with dolphins, and one pole-and-line (Figure 1). The last two fisheries include all 13 sampling areas. Of the 260 wells sampled that contained fish caught during the second quarter of 2011, 162 contained skipjack. The estimated size compositions of these fish are shown in Figure 3a. Large amounts of skipjack in the 40- to 60-cm range were caught in all of the floating-object areas and in the Southern unassociated fishery.

The estimated size compositions of the skipjack caught by all fisheries combined during the second quarters of 2006-2011 are shown in Figure 3b. The average weight for the second quarter of 2011 (2.3 kg) was equal to those of skipjack caught during the second quarters of 2008 and 2010.

There are seven surface fisheries for bigeye defined for stock assessments: four associated with floating objects, one unassociated school, one associated with dolphins, and one pole-and-line (Figure 1). The last three fisheries include all 13 sampling areas. Of the 260 wells sampled that contained fish caught during the second quarter of 2011, 46 contained bigeye. The estimated size compositions of these fish are shown in Figure 4a. The majority of the second-quarter bigeye catch was taken in floating-object sets in the Northern, Equatorial, and Southern areas. Smaller amounts of bigeye were taken in the Inshore floating-object fishery.

The estimated size compositions of the bigeye caught by all fisheries combined during the second quarters of 206-2011 are shown in Figure 4b. The average weight of bigeye during the second quarter of 2011 (9.6 kg) was greater than those of any of the previous five years.

The estimated retained purse-seine catch of bigeye less than 60 cm in length during the first two quarters of 2011 was 6,309 metric tons (t), or about 19 percent of the estimated total retained purse-seine catch of bigeye during that period. The corresponding amounts for the first two quarters of 2006-2010 ranged from 7,649 to 19,110 t, or 17 to 49 percent. These values may differ slightly from those given in previous Quarterly Reports due to changes in the estimation procedure.

BIOLOGY AND ECOSYSTERM PROGRAM

Research to evaluate the possibility of reducing the catches of small bigeye and yellowfin tuna and of non-target species in purse-seine sets on floating objects

A 73-day research cruise was undertaken during the period of 11 May to 23 July 2011 to the equatorial eastern Pacific Ocean aboard the Ecuadorian-flag Clsss-6 (fish-carrying capacity greater than 363 metric tons) purse-seine vessel *Yolanda L.*, under a charter agreement between the vessel owner and the International Seafood Sustainability Foundation (ISSF), in collaboration with the Inter-American Tropical Tuna Commission (IATTC). The objective of the cruise was to develop methods to reduce the mortalities of small bigeye and yellowfin tuna and of sharks and other non-target species captured during fishing operations directed at skipjack tuna by purse-seine vessels fishing on mixed-species aggregations associated with drifting fish-aggregating devices (FADs). ("Small," in this case, means considerably less than the critical size—about 63 kg for bigeye and 36 kg for yellowfin. The maximum yields can be achieved if most of the fish that are caught are near the critical size, rather than much less than that, as is the case for purse-seine sets on floating objects.)

The scientific committee of the ISSF bycatch program agreed that five specific research activities should be undertaken during the first cruise.

The first activity was to test different designs of FADs that might not entangle turtles or sharks, including the potential for using biodegradable materials. Ten "ecological" FADs and 51 "standard" FADs were deployed during a routine fishing trip of the *Yolanda L.* that preceded the research cruise. Two of the ecological FADs were constructed entirely of natural materials. The other eight had 2-inch (5.08-cm) stretch purse-seine netting hung from them, in contrast to the 4.5-inch (11.43-cm) or larger netting normally used. All the FADs checked during the cruise were evaluated as to their design, condition, presence of any entangled animals, and amounts of tunas associated with them. No turtles or sharks were observed entangled in the netting of any of the FADs during this cruise.

The second activity was to evaluate the accuracy of the captain's predictions of the species and size compositions of the catches from the aggregations associated with the FADs, and the potential improvements in those predictions that could be achieved through the use of additional equipment and methods. Acoustic and optical surveys of the aggregations were conducted, utilizing a SIMRAD ES70 echo-sounder and SEABOTIX LBV 200 remotely-operated vehicle (ROV) aboard a 7.5-m workboat that was carried aboard the *Yolanda L.* and launched and retrieved from it. The captain's estimates of the species and size compositions were obtained from the electronic gear described above and visual observations by the mastman. The tunas loaded aboard the vessel from nine sets were separated within wells, so as to eventually obtain the weights of the catches within sets of each species, by size class, when the fish were unloaded and sorted at the Starkist cannery in Manta, Ecuador.

The third activity was to determine whether there were spatial and/or temporal differences in the behavior of skipjack, bigeye, and yellowfin tuna within aggregations associated with FADs, in order to reveal potential opportunities for avoiding the capture of juvenile bigeye and yellowfin and of non-target species while maximizing the capture of skipjack. Ultrasonic telemetry experiments were to be undertaken at a minimum of 10 FADs, with a minimum of 30 metric tons of tunas present. The proposed methods included the capture and tagging, with attachment of coded acoustic tags to three skipjack, three bigeye, and three yellowfin tunas, and continuous acoustic tags in three additional skipjack. (Coded tags were used to monitor several fish simultaneously in close proximity to a FAD using automated VEMCO VR2W receivers, whereas continuous tags were used in conjunction with a VEMCO VR28 tracking system to monitor a single skipjack when it moved away from a FAD.) Each experiment was to be conducted for a minimum of 48 hours. If a mono-specific skipjack school were observed a distance of 1 or more nm from the FAD while tracking a skipjack tagged with a continuous acoustic tag, the purse-seine vessel would set on that school. No such sets were made during this cruise.

The fourth activity was to investigate the behavior of tunas and sharks within the net to determine if species-specific aggregations occur, and the spatial and temporal characteristics of such aggregations, if they exist. The workboat was to remain adjacent to the FAD during a predawn set. Records from the echo-sounder were to be recorded during the set. After dawn, the ROV was to be deployed with adequate light to observe and record the behavior of the tunas and sharks in the net. Simultaneously, observations would be recorded by video from the mast of the purse-seine vessel. Observations and recordings of the behavior of the tunas and sharks within the net would be conducted for up to 6 hours after the rings are aboard and when 25 percent of the net was in the water. No experiments for this activity were undertaken because the precautionary requirements stipulated by the captain were not met during the cruise. These included sets on small aggregations of tunas and calm ocean conditions.

The fifth activity was to determine the at-vessel mortality, the post-release survival, and the physiological, biochemical, and molecular responses of sharks incidentally captured by purse seiners. The numbers, species compositions, at-vessel mortality, and physical condition of sharks loaded aboard the vessel were assessed during the cruise. The physical and physiological condition of the sharks immediately after loading, and prior to release, were determined, to characterize the overall impact of capture and handling. The post-release mortality rates were to be determined by directly recording the sharks' vertical and horizontal movement patterns for 30 to 45 days, using Wildlife Computers mini-PAT tags. Eight silky sharks were tagged and released during the cruise.

Early life history studies

Yellowfin broodstock

The yellowfin broodstock in Tank 1 (1,362,000 L) at the Achotines Laboratory spawned daily during the quarter. Spawning occurred between 10:40 p.m. and 00:00 a.m. The numbers of eggs collected after each spawning event ranged from about 45,000 to 583,000. The water temperatures in the tank during the quarter ranged from 27.9° to 29.1°C.

At the end of the quarter there were two 58-kg yellowfin, seven 36- to 47-kg yellowfin, and three 16- to 18-kg yellowfin in Tank 1, and two 5- to 6-kg yellowfin in the 170,000-L reserve broodstock tank (Tank 2).

During late 2008, 6 of the 15 yellowfin (7 to 10 kg) held in Tank 2 were implanted with prototype archival tags and transferred to Tank 1. During the quarter, the last of the archival-tagged fish from the October 2008 group, died after striking the tank wall.

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.

More than 200 early-juvenile yellowfin were maintained by the Achotines Laboratory staff through 45 days of age. These fish were reared as part of a growth experiment that was completed during June 2011. In late July, the fish were sacrificed for later analysis of amino acid composition and biochemical indicators. This analysis is being conducted as part of the joint Kinki University-IATTC-Autoridad de los Recursos Acuáticos de Panama (ARAP) 5-year project being conducted under the SATREPS (Science and Technology Research Partnership for Sustainable Development) program described below.

Collaborative research on yellowfin and bluefin tuna

As reported in the IATTC Quarterly Report for January-March 2011, representatives of Kinki University in Japan, the IATTC, and ARAP signed an agreement in January 2011 to conduct comparative research on the early life history and reproductive biology of Pacific bluefin tuna and yellowfin tuna. The joint research project, which is being conducted mostly at the Fisheries Laboratories of Kinki University in Wakayama Prefecture, Japan, and at the IATTC's Achotines Laboratory, began in early 2011 and will continue for 5 years. It is being conducted by members of the faculty of Kinki University, the Early Life History Group of the IATTC, and staff scientists of ARAP. The project is being implemented under the SATREPS program. The studies conducted in Japan are being supported by the Japan Science and Technology Agency (JST), and those undertaken in Panama are being supported by the Japan International Cooperation Agency (JICA). From mid-May through June 2011, Kinki University scientists initiated joint studies, conducted with the Early Life History Group of the IATTC, ARAP staff members, and Achotines Laboratory staff members, to investigate aspects of the growth, feeding, physiology, and genetics of early life stages of yellowfin.

As part of the joint early life history studies, the Early Life History Group of the IATTC spent the period of early July through early August 2011 at the Oshima Experimental Station of the Fisheries Laboratory, Kinki University, in Wakayama Prefecture, Japan. During their stay, they initiated several experiments with members of the Kinki University faculty and staff to investigate the growth potential of Pacific bluefin larvae under variable food conditions. The experiments were a continuation of comparative studies of Pacific bluefin and yellowfin early life histories being conducted under the SATREPS program. During July and August 2011, Pacific bluefin larvae were reared in replicated trials under semi-low (200-700 rotifers/L) and semi-high (1,000-2,000 rotifers/L) food levels and the growth rates over 10 days of feeding were estimated. Additional trials were conducted to compare the effectiveness of two types of fatty acid enrichment products used to enhance larval food organisms on the growth and survival of Pacific bluefin larvae. The comparative growth experiments will be continued in both Panama and Japan during 2012.

Shipment of eggs and larvae to the Hubbs Sea World Research Institute

The Early Life History Group and Hubbs Sea World Research Institute (HSWRI) of San Diego, California, USA, were awarded a grant in 2009 by the Saltonstall-Kennedy Program of the U.S. National Oceanic and Atmospheric Administration to conduct feasibility studies of the air shipment and subsequent rearing of yellowfin tuna eggs and larvae. The project has been in progress, with multiple air shipments of yellowfin eggs and larvae sent from the Achotines Laboratory to HSWRI in San Diego during 2010 and January-May of 2011. During July, August, and September of 2011, three additional shipments (one each month) of three boxes, containing two bags each of eggs or larvae stocked in seawater, arrived at the HSWRI about 24 to 36 hours after leaving the Achotines Laboratory. The initial survival of the eggs and larvae was good. Extended rearing of the larvae at HSWRI resulted in poor survival, but efforts were being made to improve the post-shipment rearing success at HSWRI. Several additional shipments of eggs and larvae are scheduled for the first half of 2012.

Workshop on physiology and aquaculture of pelagic fishes

The IATTC and the University of Miami (Miami, Florida, USA) held their ninth workshop, "Physiology and Aquaculture of Pelagics, with Emphasis on Reproduction and Early Developmental Stages of Yellowfin Tuna," from 6 to 16 July 2011. The organizers were Dr. Daniel Margulies and Mr. Vernon P. Scholey of the IATTC staff and Dr. Daniel Benetti, Director of the Aquaculture Program of the Rosenstiel School of Marine and Atmospheric Science (RSMAS), University of Miami. Mr. Scholey and Dr. Benetti served as instructors. The participants were Dr. Terry Bradley of the University of Rhode Island, Messrs. Roberto V. Guzman, German E. Merino, and Mario Palma of the Universidad Católica del Norte, Coquimbo, Chile, Dr. Paul Olin of California Sea Grant-University of California at San Diego, and Ms. Lindsey Woolley of Flinders University, Adelaide, Australia. In addition, eight of Dr. Benetti graduate students attended portions of the workshop. A fee for the participants and students covered the expenses of putting on the workshop. As part of the workshop, yellowfin larvae and juveniles were cultured from the egg stage through the fourth week of feeding. (Some larval cultures had been initiated prior to the beginning of the workshop).

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. During the second and third quarters of 2009, the broodstock fish died due to low water temperatures and feeding problems. The mortality coincided with ARAP's plans to commence spawning and rearing studies during 2010 with a new, more commercially-important species of snapper. Yellow snapper (*Lutjanus argentiventris*) was chosen as the new species of snapper for study. In addition, ARAP decided to rebuild its spotted rose snapper broodstock. The fish were acquired from local fishermen. During 2010 there were 62 spotted rose snappers and 19 yellow snappers being held in broodstock tanks at the Laboratory. However, by the end of September 2010 only nine spotted rose snappers remained (IATTC Quarterly Report for October-December 2010). The collection of more spotted rose snappers began in February 2011 and continued through September. At the end of the quarter, there were 10 spotted rose snappers being held in a broodstock tank at the Laboratory.

Visitors at the Achotines Laboratory

On 11 and 12 August 2011, the Autoridad de los Recursos Acuáticos de Panamá (ARAP) Sub-Administrator and Director of Investigations visited the Achotines Laboratory, where they discussed progress on the joint SATREPS project and the project symposium to be held in Panama City in mid-November 2011.

On 13 and 14 September 2011, Ms. Olga Cedeño, a civil engineer with ARAP, visited the Achotines Laboratory to inspect and evaluate the pier in Achotines Bay in preparation for ARAP to schedule pier maintenance in 2012 or 2013.

Oceanography and meteorology

Easterly surface winds blow almost constantly over northern South America, which cause upwelling of cool, nutrient-rich subsurface water along the equator east of 160ºW, in the coastal regions off South America, and in offshore areas off Mexico and Central America. El Niño events are characterized by weaker-than-normal easterly surface winds, which cause above-normal sea-surface temperatures (SSTs) and sea levels and deeper-than-normal thermoclines over much of the tropical eastern Pacific Ocean (EPO). In addition, the Southern Oscillation Indices (SOIs) are negative during El Niño episodes. (The SOI is the difference between the anomalies of sea-level atmospheric pressure at Tahiti, French Polynesia, and Darwin, Australia. It is a measure of the strength of the easterly surface winds, especially in the tropical Pacific in the Southern Hemisphere.) Anti-El Niño events, which are the opposite of El Niño events, are characterized by stronger-than-normal easterly surface winds, below-normal SSTs and sea levels, shallower-than-normal thermoclines, and positive SOIs. Two additional indices, the NOI* (Progress Ocean., 53 (2-4): 115-139) and the SOI*, have recently been devised. The NOI* is the difference between the anomalies of sea-level atmospheric pressure at the North Pacific High (35°N-130°W) and Darwin, Australia, and the SOI* is the difference between the anomalies of sea-level atmospheric pressure at the South Pacific High (30°S-95°W) and Darwin. Ordinarily, the NOI* and SOI* values are both negative during El Niño events and positive during anti-El Niño events.

There was a sizeable area of cool water in the eastern and central Pacific Ocean during the fourth quarter of 2010, which reached a maximum in December of that year (IATTC Quarterly Report for October-December 2010: Figure 6). The size of that area decreased during the first quarter of 2011 due to warming of the water between the coast and about 120°W (IATTC Quarterly Report for January-March 2012: Figure 8), and during the second quarter some small areas of warm water appeared off northern South America (IATTC Quarterly Report for April-June 2011: Figure 5). The SSTs were below average, with only one exception, from July 2010 through March 2011, but the SST anomalies in Area 1 were above average during April, May, and June of 2011 (Table 4). The thermoclines along the equator were somewhat deeper during January-June 2011 than they had been during July-December 2010, indicating the weakening and subsequent disappearance of the anti-El Niño conditions of late 2010 and early 2011. During the third quarter, however, the warming trend came to an end, as small areas of cool water appeared in July and August, and then more cool water appeared in September, especially off southern Peru and northern Chile (Figure 5). There were no positive temperate anomalies in Areas 1-4 after July 2011 (Table 4). The SOIs were all positive from October 2010 through September 2011, but a few of the SOI*s and NOI*s during that period were negative. According to the Climate Diagnostics Bulletin of the U.S. National Weather Service for September 2011, "a weak or moderate strength [anti-El Niño event] is most likely [to occur] during the Northern Hemisphere winter."

BYCATCH PROGRAM AND AIDCP 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 third quarter of 2011. Field office personnel placed IATTC observers on 109 fishing trips of Class-6 purse seiners (vessels with fish-carrying capacities greater than 363 metric tons) that participated in the AIDCP On-Board Observer Program during the quarter. Also, IATTC observers were placed on two fishing trips of smaller vessels. In addition, 117 IATTC observers completed trips during the quarter and were debriefed by field office personnel. IATTC observers also completed trips on two smaller vessels and on one Class-6 vessel that completed a trip that was conducted entirely outside the area of jurisdiction of the IATTC.

Observer program

Coverage

The Agreement on the International Dolphin Conservation Program (AIDCP) requires 100-percent coverage by observers on trips by purse seiners with carrying capacities greater than 363 metric tons that fish for tunas in the eastern Pacific Ocean (EPO). This mandate is carried out by the AIDCP On-Board Observer Program, made up of the IATTC's international observer program and the observer programs of Colombia, Ecuador, the European Union, Mexico, Nicaragua, Panama, and Venezuela. The observers are biologists trained to collect a variety of data on the mortalities of dolphins associated with the fishery, sightings of dolphin herds, catches of tunas and bycatches of fish and other animals, oceanographic and meteorological data, and other information used by the IATTC staff to assess the conditions of the various stocks of dolphins, study the causes of dolphin mortality, and assess the effect of the fishery on tunas and other components of the ecosystem. The observers also collect data relevant to compliance with the provisions of the AIDCP, and data required for the tuna-tracking system established under the AIDCP, which tracks the "dolphin-safe" status of tuna caught in each set from the time it is captured until it is unloaded (and, after that, until it is canned and labeled).

In 2011 the observer programs of Colombia, the European Union, Mexico, Nicaragua, Panama, and Venezuela are to sample half, and that of Ecuador approximately one-third, of the trips by vessels of their respective fleets, while IATTC observers are to sample the remainder of those trips. Except as described in the next paragraph, the IATTC is to cover all trips by vessels registered in other nations that are required to carry observers.

At the fifth meeting of the Parties to the AIDCP in June 2001, observers from the international observer program of the South Pacific Forum Fisheries Agency (FFA) were approved to collect pertinent information for the On-Board Observer Program, pursuant to Annex II (9) of the AIDCP in cases for which the Director determines that the use of an observer from the AIDCP On-Board Observer Program is not practical.

Observers from the On-Board Observer Program departed on 171 fishing trips aboard class-6 purse seiners covered by that program during the third quarter of 2011. In addition, observers from the On-Board Observer Program departed on five vessels less than size class-6. Preliminary coverage data for these vessels during the quarter are shown in Table 5.

Training

An IATTC observer training course was conducted in Manta, Ecuador, on 12-28 September 2011 for 16 trainees, 6 of whom were from the Ecuadorian national observer program.

GEAR PROJECT

An IATTC staff member participated in one dolphin safety-gear inspection and safety-panel alignment procedure aboard a Mexican-flag purse seiner during the third quarter of 2011.

INTER-AGENCY COOPERATION

At the request of the Peruvian government, Mr. Vernon P. Scholey traveled to Tumbes, Peru, where he spent the period of August 1-4, 2011. In Tumbes he visited the MARINAZUL, S.A., shrimp and mollusk hatchery, where there are plans to construct a tuna broodstock facility and a hatchery for tuna fingerling production. His travel expenses were paid by MARINAZUL.

On 1 September 2011, Mr. Raúl Martínez Rincón, a Ph.D. candidate at the Centro Interdisciplinario de Ciencias Marinas-Instituto Politécnico Nacional of Mexico, began a 3-month stay at the IATTC headquarters in La Jolla, where he is working with Drs. Mark N. Maunder, Alexandre Aires-da-Silva, and Cleridy E. Lennert-Cody on methods to predict spatial distributions of bycatches.

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ADMINISTRATION

Ms. Susana Cusatti was hired as a biologist at the Achotines Laboratory on 16 August 2011. She had previously worked at the Achotines Laboratory from 10 July 2009, to 5 March 2010. On that date she resigned her position to accept a Fulbright Scholarship to study at Scripps Institution of Oceanography, La Jolla, California, USA, where she earned a Master of Science degree in Advanced Studies in Marine Biodiversity and Conservation on 16 August 2011. She is to be commended for her hard work, and everyone is pleased that she has rejoined the IATTC staff.

On 15 September 2011, Mr. Francisco A. Robayo Villacís, a graduate of the University of Guayaquil, was hired for a 1-year period as a "Tag Recovery Technician" at the Manta field office. He had previously worked at the Manta field office from 1 December 2007 to 30 June 2011, assisting with the program to collect data on the retained catches of small purse seiners, which was carried out from 1 January 2006 to 31 May 2009. The costs of his employment are being paid by the Secretariat of the Pacific Community (SPC). The SPC is conducting extensive tagging operations in the western and central Pacific Ocean, and many of the tagged fish are appearing at the canneries in Manta. He will also be collecting tags and recapture information for tags of other organizations, including, of course, the IATTC.

Mr. Simon Roberts, assistant computer systems manager, resigned on 16 September 2011 to accept other employment. Everyone wishes him well in his new position. He was replaced by Mr. Jeffrey L. Morgan on 21 September 2011.

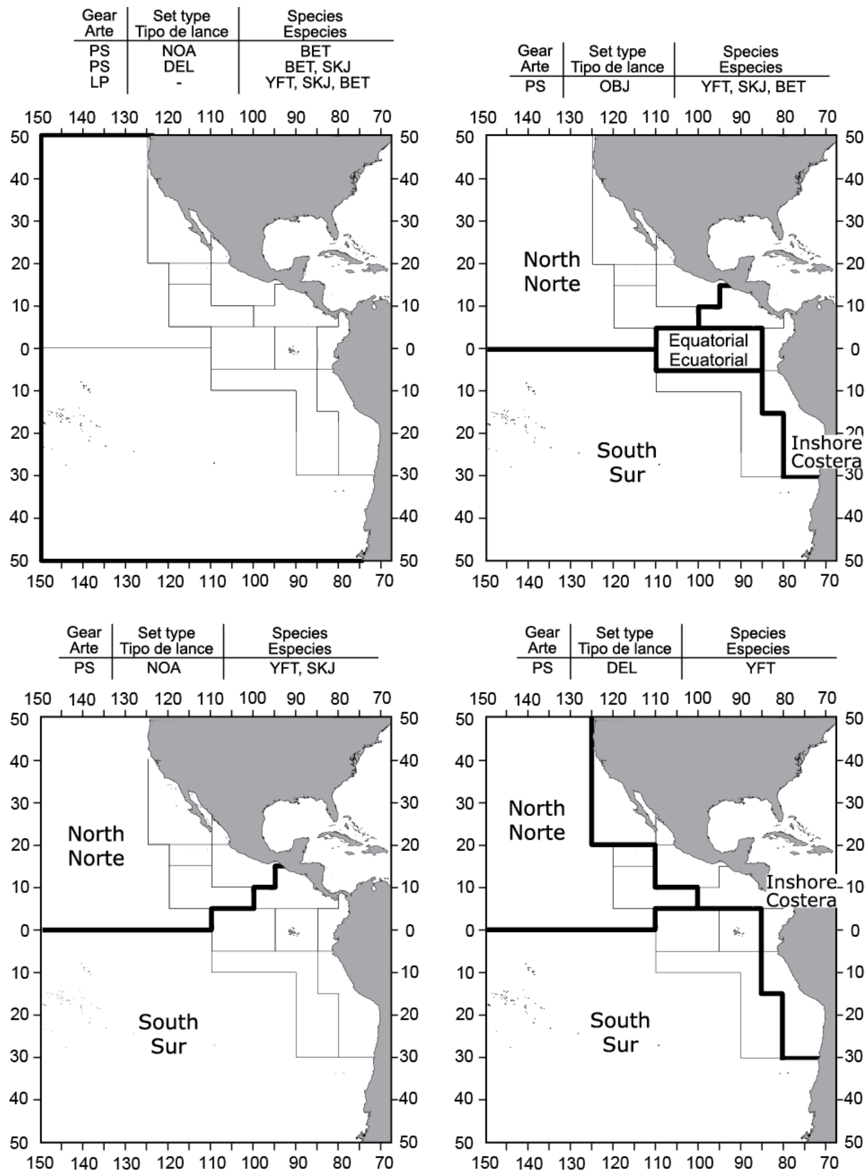

FIGURE 1. Spatial extents of the fisheries defined by the IATTC staff for stock assessment of yellowfin, skipjack, and bigeye in the EPO. The thin lines indicate the boundaries of the 13 length-frequency sampling areas, and the bold lines the boundaries of the fisheries. Gear: PS = purse seine, LP = pole and line; Set type: NOA = unassociated, DEL = dolphin, OBJ = floating object; Species: YFT = yellowfin, SKJ = skipjack, BET = bigeye.
FIGURA 1. Extensión espacial de las pesquerías definidas por el personal de la CIAT para la evaluación de las poblaciones de atún aleta amarilla, barrilete, y patudo en el OPO. Las líneas delgadas indican los límites de las 13 zonas de muestreo de frecuencia de tallas, y las líneas gruesas los límites de las pesquerías. Artes: PS = red de cerco, LP = caña; Tipo de lance: NOA = peces no asociados, DEL = delfín; OBJ = objeto flotante; Especies: YFT = aleta amarilla, SKJ = barrilete, BET = patudo.

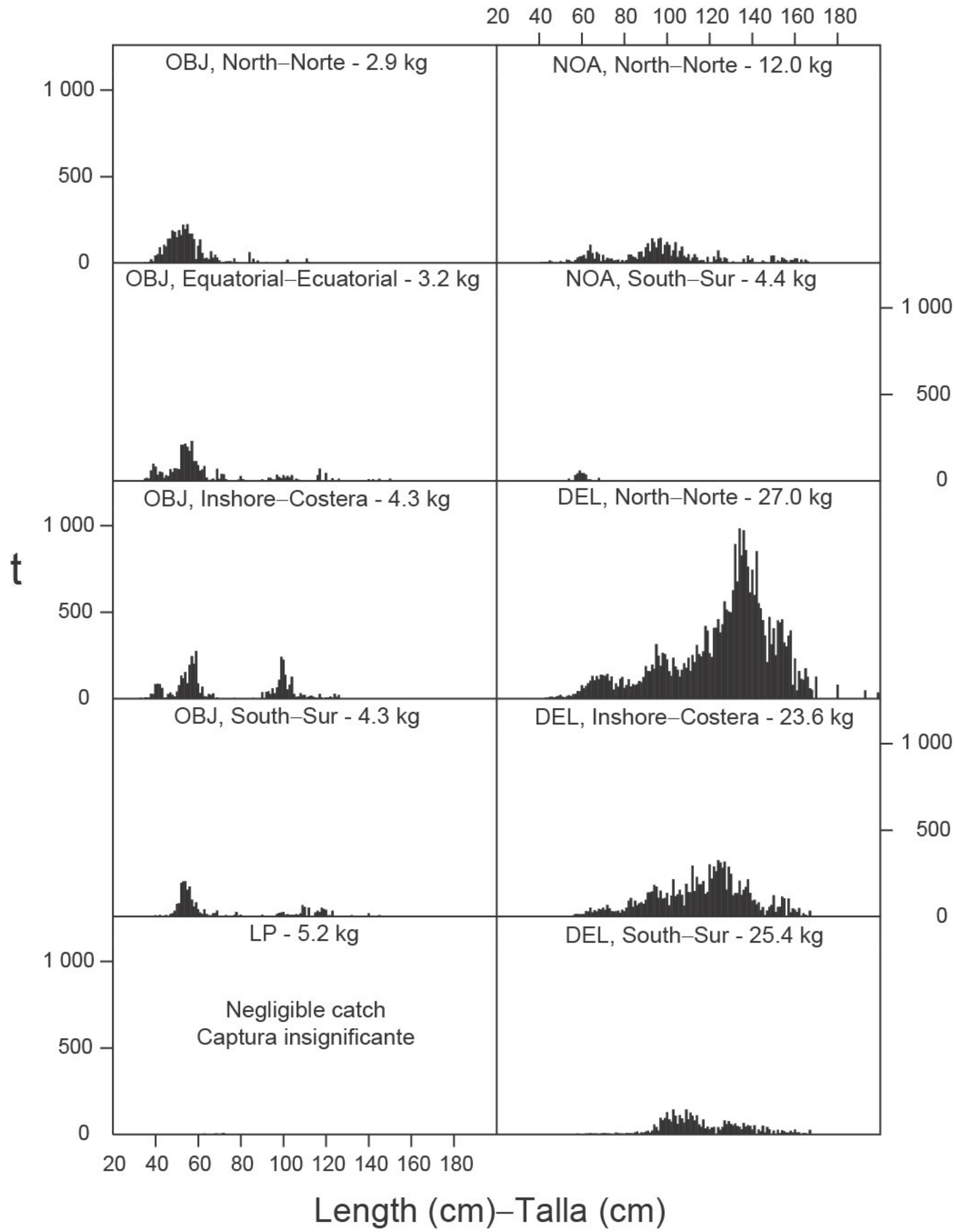

FIGURE 2a. Estimated size compositions of the yellowfin caught in each fishery of the EPO during the second quarter of 2011. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 2a. Composición por tallas estimada para el aleta amarilla capturado en cada pesquería del OPO durante el segundo trimestre de 2011. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caña; NOA = peces no asociados; DEL = delfín; t = toneladas métricas.

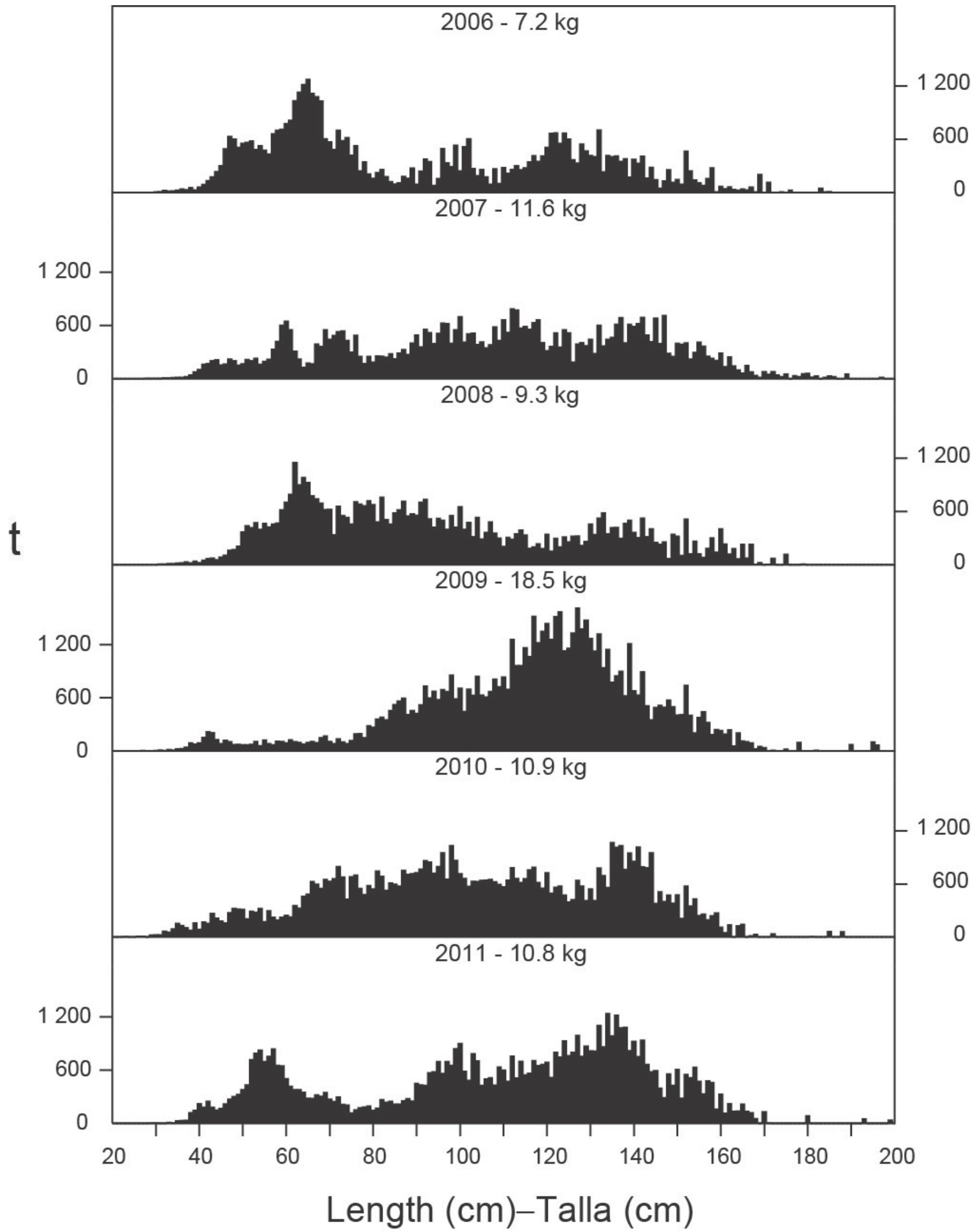

FIGURE 2b. Estimated size compositions of yellowfin tuna caught in the EPO during the second quarter of 2006-2011. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 2b. Composición por tallas estimada para el aleta amarilla capturado en el OPO en el segundo trimestre de 2006-2011. En cada recuadro se detalla el peso promedio de los peces en las muestras; t = toneladas métricas.

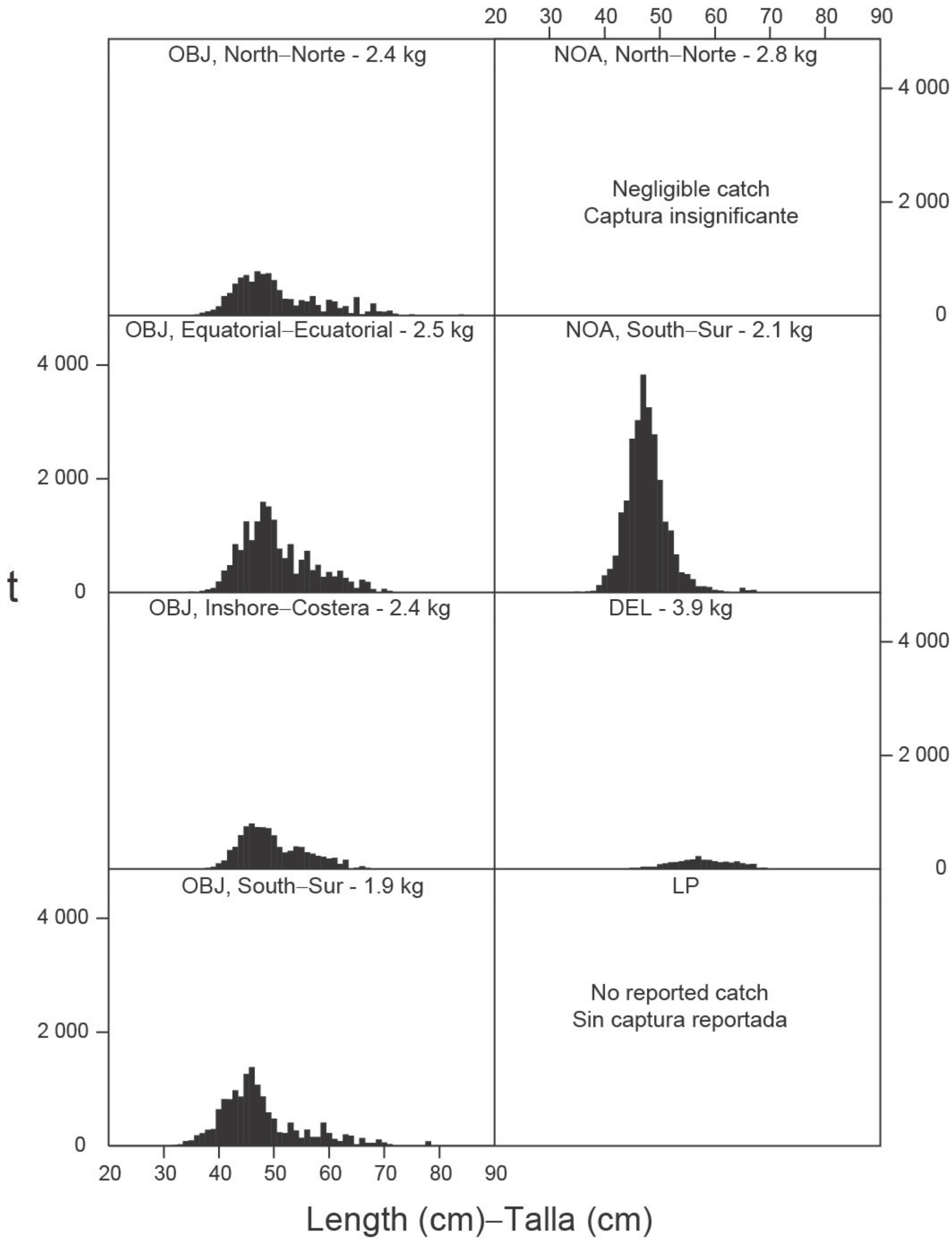

FIGURE 3a. Estimated size compositions of the skipjack caught in each fishery of the EPO during the second quarter of 2011. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 3a. Composición por tallas estimada para el barrilete capturado en cada pesquería del OPO durante el segundo trimestre de 2011. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caña; NOA = peces no asociados; DEL = delfín; t = toneladas métricas.

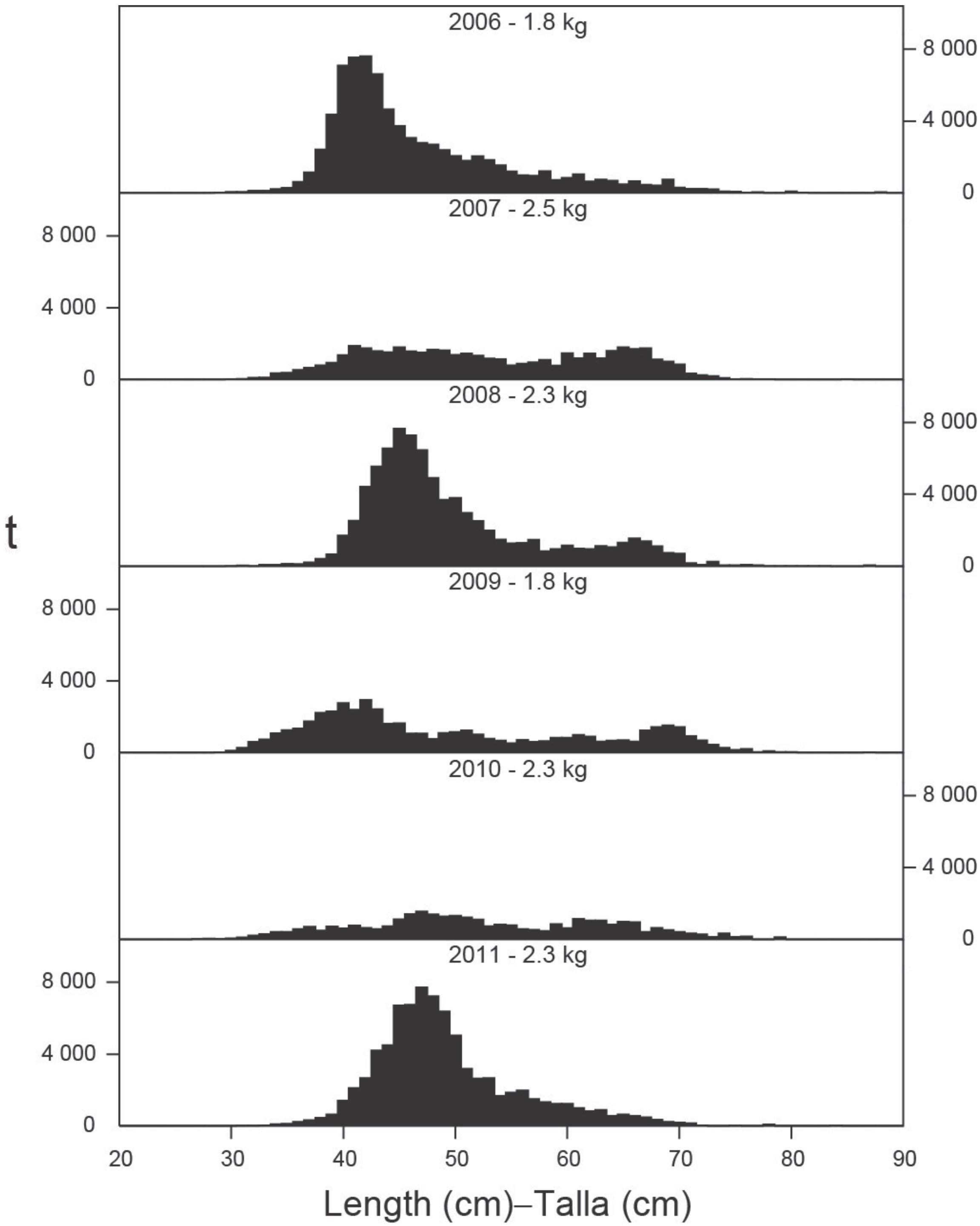

FIGURE 3b. Estimated size compositions of the skipjack caught in the EPO during the second quarter of 2006-2011. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 3b. Composición por tallas estimada para el barrilete capturado en el OPO en el segundo trimestre de 2006-2011. En cada recuadro se detalla el peso promedio de los peces en las muestras. t = toneladas métricas.

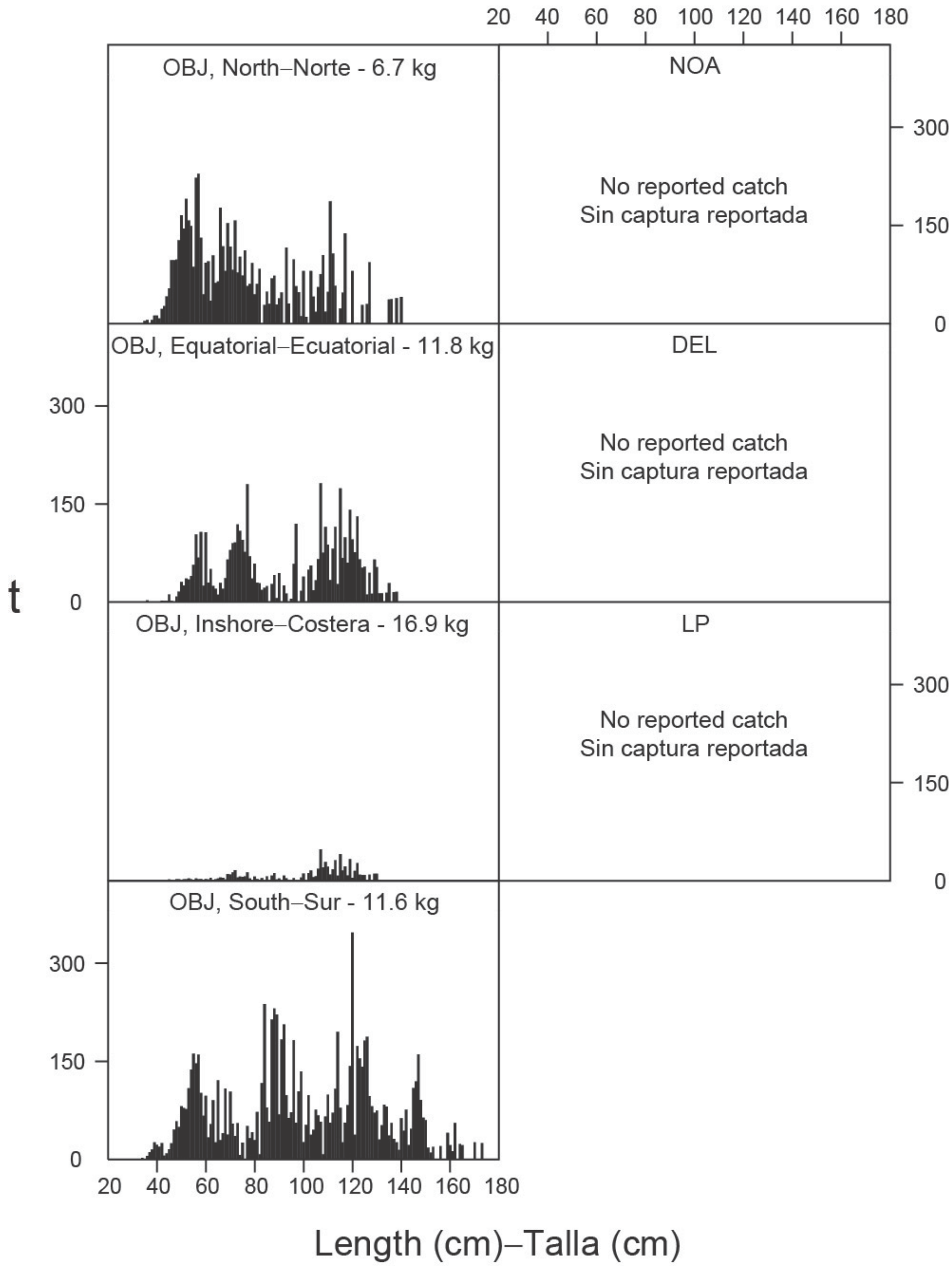

FIGURE 4a. Estimated size compositions of the bigeye caught in each fishery of the EPO during the second quarter of 2011. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin; t = metric tons.

FIGURA 4a. Composición por tallas estimada para el patudo capturado en cada pesquería del OPO durante el segundo trimestre de 2011. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caña; NOA = peces no asociados; DEL = delfín; t = toneladas métricas.

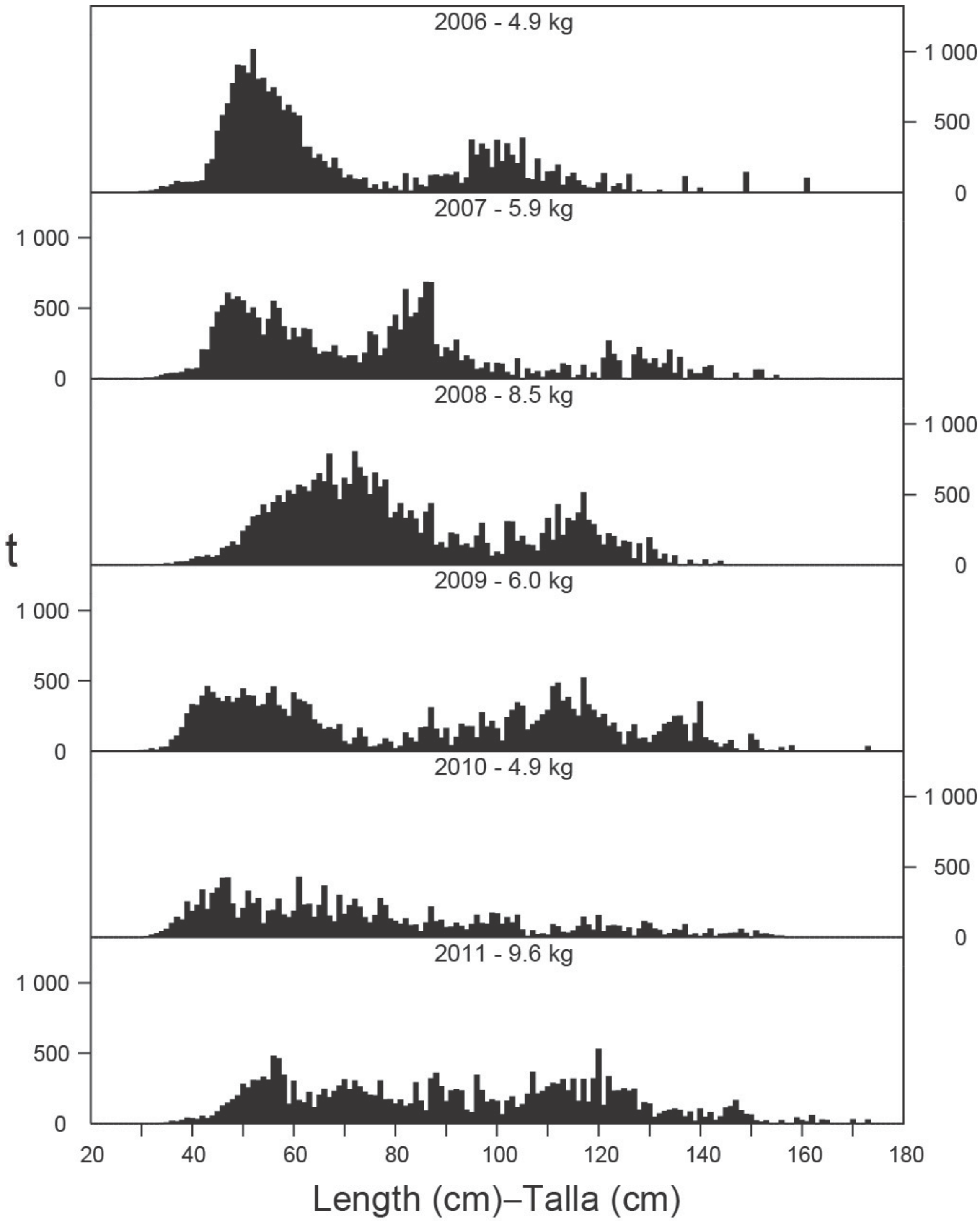

FIGURE 4b. Estimated size compositions of the bigeye caught in the EPO during the second quarter of 2006-2011. The average weights of the fish in the samples are given at the tops of the panels. t = metric tons.

FIGURA 4b. Composición por tallas estimada para el patudo capturado en el OPO en el segundo trimestre de 2006-2011. En cada recuadro se detalla el peso promedio de los peces en las muestras; t = toneladas métricas.

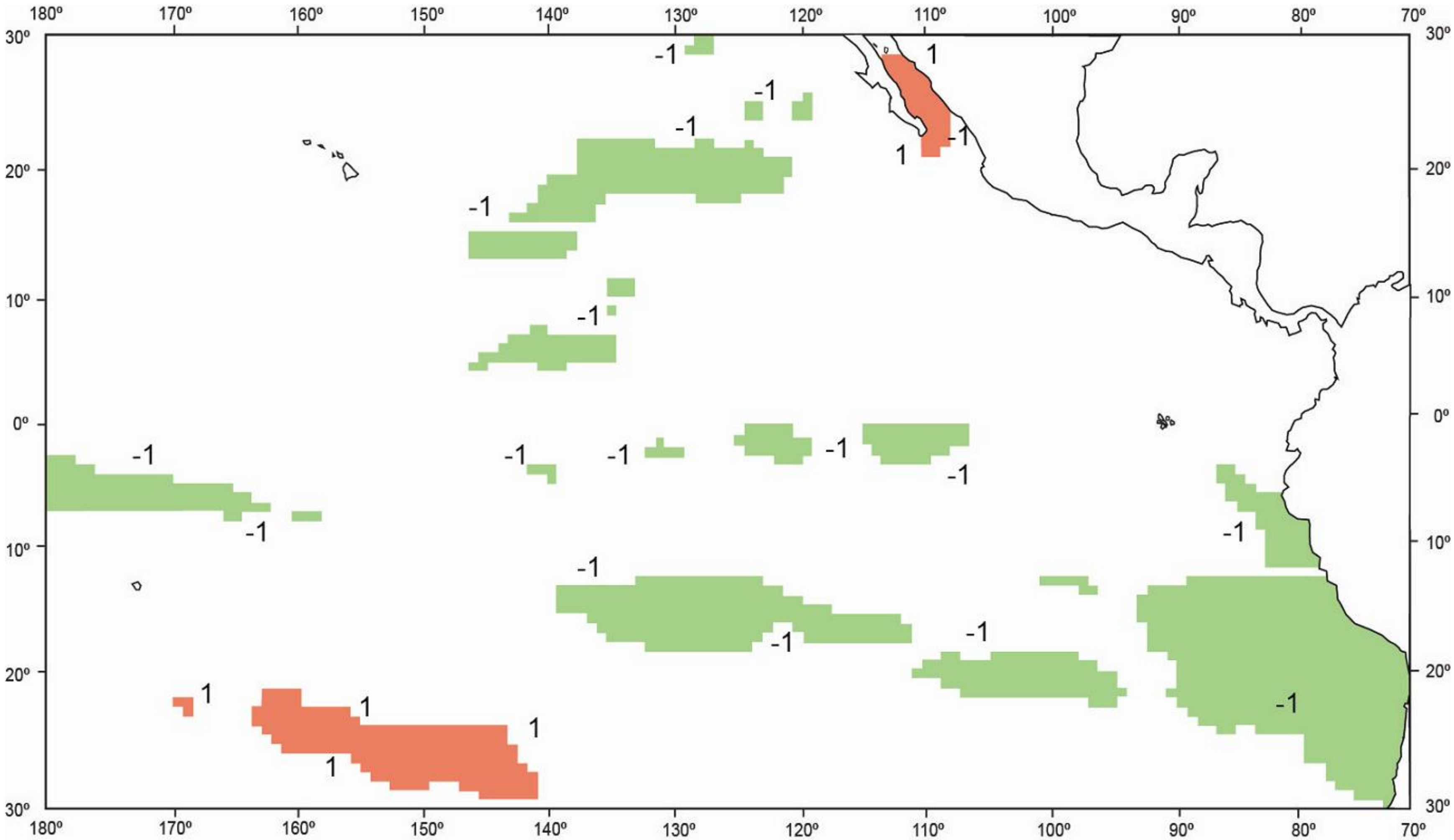

FIGURE 5. Sea-surface temperature (SST) anomalies (departures from long-term normals) for September 2011, based on data from fishing boats and other types of commercial vessels.
FIGURA 5. Anomalías (variaciones de los niveles normales a largo plazo) de la temperatura superficial del mar (TSM) en septiembre de 2011, basadas en datos tomados por barcos pesqueros y otros buques comerciales.

TABLE 1. Estimates of the numbers and capacities, in cubic meters, of purse seiners and pole-and-line vessels operating in the EPO in 2011 by flag, gear, and well volume. Each vessel is included in the totals for each flag under which it fished during the year, but is included only once in the fleet total. Therefore the totals for the fleet may not equal the sums of the individual flag entries. PS = purse seine; LP = pole-and-line.

TABLA 1. Estimaciones del número de buques cerqueros y cañeros que pescan en el OPO en 2011, y de la capacidad de acarreo de los mismos, en metros cúbicos, por bandera, arte de pesca, y volumen de bodega. Se incluye cada buque en los totales de cada bandera bajo la cual pescó durante el año, pero solamente una vez en el total de la flota; por consiguiente, los totales de las flotas no son siempre iguales a las sumas de las banderas individuales. PS = cerquero; LP = cañero.

Flag	Gear	Well volume–Volumen de bodega				Capacity
Bandera	**Arte**	**1-900**	**901-1700**	**>1700**	**Total**	**Capacidad**
			Number—Número			
Belice—Belize	PS	-	1	-	1	1,488
Bolivia	PS	1	-	-	1	222
Colombia	PS	4	10	-	14	14,860
Ecuador	PS	65	15	9	89	65,595
España—Spain	PS	-	-	4	4	10,116
Guatemala	PS	-	2	1	3	4,819
México	PS	9	30	1	40	46,129
	LP	3	-	-	3	255
Nicaragua	PS	-	7	1	8	11,172
Panamá	PS	2	12	4	18	24,701
El Salvador	PS	-	1	3	4	7,415
USA—EE.UU.	PS	-	3	-	3	4,046
Venezuela	PS	-	18	-	18	24,007
Vanuatu	PS	1	2	-	3	3,609
All flags—	PS	82	99	22	203	
Todas banderas	LP	3	-	-	3	
	PS + LP	85	99	22	206	
			Capacity—Capacidad			
All flags—	PS	38,184	128,796	46,697	213,677	
Todas banderas	LP	255	-	-	255	
	PS + LP	38,439	128,796	46,697	213,932	

TABLE 2. Estimates of the retained catches of tunas in the EPO from 1 January through 2 October 2011, by species and vessel flag, in metric tons.
TABLA 2. Estimaciones de las capturas retenidas de atunes en el OPO del 1 de enero al 2 de octubre de 2011, 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	25,924	113,039	21,628	-	3	-	70	174	160,838	36.6
México	87,473	9,415	91	2,627	7,788	-	1,867	-	109,261	24.9
Nicaragua	5,868	3,369	1,255	-	-	-	-	5	10,497	2.4
Panamá	16,555	22,526	5,062	-	-	-	-	169	44,312	10.1
Venezuela	16,049	19,925	109	-	-	-	35	153	36,271	8.3
Other—Otros[2]	26,274	42,265	9,705	-	-	-	69	107	78,420	17.7
Total	178,143	210,539	37,850	2,627	7,791	-	2,041	608	439,599	

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

TABLE 3. Reported catches of bigeye tuna in the EPO during 2011 by longline vessels.
TABLA 3. Capturas reportadas de atún patudo en el OPO durante 2011 por buques palangreros.

Country	**First quarter**	**Second quarter**	**Third quarter**				**Total to date**
			July	**August**	**September**	**Total**	
Pais	**Primer trimestre**	**Segundo trimestre**	**Tercer trimestre**				**Total al fecha**
			Julio	**Agosto**	**Septiembre**	**Total**	
China	767	426	-	-	-	-	1,193
Japan—Japón	2,776	2,802	902	963	1,101	2,966	8,544
Republic of Korea—República de Corea	2,764	1,072	-	-	-	-	3,836
Chinese Taipei—Taipei Chino	723	395	112	-	-	112	1,230
USA—	-	-	-	-	-	-	-
Vanuatu	-	-	-	-	-	-	-
Total	7,030	4,695	1,014	963	1,101	3,078	14,803

TABLE 4. Oceanographic and meteorological data for the Pacific Ocean, October 2010-September 2011. The values in parentheses are anomalies. SST = sea-surface temperature; SOI = Southern Oscillation Index; SOI* and NOI* are defined in the text.
TABLA 4. Datos oceanográficos y meteorológicos del Océano Pacífico, octubre 2010-septiembre 2011. 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	**10**	**11**	**12**	**1**	**2**	**3**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	19.1 (-1.9)	20.0 (-1.6)	21.4 (-1.5)	23.9 (-0.7	26.0 (0.1)	26.2 (-0.4)
Area 2 (5°N-5°S, 90°-150°W	23.3 (-1.6)	23.4 (-1.6)	23.5 (-1.6)	24.2 (-1.4)	25.5 (-0.9)	26.4 (-0.8)
Area 3 (5°N-5°S, 120°-170°W)	25.0 (-1.6)	25.1 (-1.5)	24.9 (-1.5)	24.9 (-1.7)	25.4 (-1.3)	26.2 (-1.0)
Area 4 (5°N-5°S, 150W°-160°E)	27.1 (-1.4)	27.1 (-1.3)	26.9 (-1.4)	26.7 (-1.6)	26.9 (-1.2)	27.4 (-0.8)
Talara, Perú	15.8 (-2.1)	15.9 (-2.2)	15.6 (-3.1)	-	-	-
Callao, Perú	13.9 (-1.3)	13.7 (-2.0)	14.1 (-2.1)			
Thermocline depth—Profundidad de la termoclina, 0°, 80°W (m)	40	40	35	30	20	10
Thermocline depth—Profundidad de la termoclina, 0°, 110°W (m)	25	15	10	25	50	75
Thermocline depth—Profundidad de la termoclina, 0°, 150°W (m)	115	120	125	120	160	140
Thermocline depth—Profundidad de la termoclina, 0°, 180°W (m)	185	160	170	190	200	200
Sea level—Nivel del mar, Callao, Perú (cm)	96.5 (-9.3)	95.4 (-11.8)	100.2 (-8.3)			
SOI—IOS	1.7	1.3	2.9	2.3	2.7	2.5
SOI*—IOS*	3.98	4.12	6.03	3.85	2.00	3.50
NOI*—ION*	1.90	4.02	-2.89	5.23	4.64	0.89

Month—Mes	**4**	**5**	**6**	**7**	**8**	**9**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	25.8 (0.2)	25.0 (0.8)	23.8 (0.9)	22.1 (0.5)	20.6 (0.0)	19.7 (-0.6)
Area 2 (5°N-5°S, 90°-150°W	27.2 (-0.3)	27.0 (-0.1)	26.6 (0.1)	25.7 (0.1)	24.6 (-0.4)	24.2 (-0.6)
Area 3 (5°N-5°S, 120°-170°W)	27.0 (-0.8)	27.4 (-0.5	27.5 (-0.2)	27.0 (-0.2)	26.2 (-0.6)	26.0 (-0.7)
Area 4 (5°N-5°S, 150W°-160°E)	27.9 (-0.7)	28.3 (-0.5)	28.5 (-0.4)	28.5 (-0.30	28.3 (-0.4)	28.1 (-0.6)
Talara, Perú	-	-	-			
Callao, Perú	-	-	-			
Thermocline depth—Profundidad de la termoclina, 0°, 80°W (m)	15	25	25	35	35	35
Thermocline depth—Profundidad de la termoclina, 0°, 110°W (m)	40	55	40	55	55	35
Thermocline depth—Profundidad de la termoclina, 0°, 150°W (m)	140	125	115	120	110	115
Thermocline depth—Profundidad de la termoclina, 0°, 180°W (m)	180	185	180	175	165	165
Sea level—Nivel del mar, Callao, Perú (cm)	-	-	-	-	-	-
SOI—IOS	1.9	0.4	0.2	1.0	0.4	1.0
SOI*—IOS*	4.09	1.27	3.29	3.77	-0.11	0.14
NOI*--ION*	3.59	0.95	-0.36	-0.39	0.47	0.29

TABLE 5. Preliminary data on the sampling coverage of trips by Class-6 purse-seine vessels (vessels with fish-carrying capacities greater than 363 metric tons) by the observer programs of the IATTC, Colombia, Ecuador, the European Union, Mexico, Nicaragua, Panama, and Venezuela during the third quarter of 2011. The numbers in parentheses indicate cumulative totals for the year.
TABLA 5. Datos preliminares de la cobertura de muestreo de viajes de buques de Clase 6 (buques con capacidad de acareo de peces mayor a 363 toneladas métricas) por los programas de observadores de la CIAT, Colombia, Ecuador, México, Nicaragua, Panamá, la Unión Europea, y Venezuela durante el tercer trimestre de 2011. Los números entre paréntesis indican los totales acumulados para el año.

Flag	Trips		Observed by program						Percent observed	
			IATTC		National		Total			
Bandera	Viajes		Observado por programa						Porcentaje observado	
			CIAT		Nacional		Total			
Colombia	12	(41)	9	(21)	3	(20)	12	(41)	100.0	(100.0)
Ecuador	47	(228)	31	(150)	16	(78)	47	(228)	100.0	(100.0)
España—Spain	6	(16)	2	(6)	4	(10)	6	(16)	100.0	(100.0)
Guatemala	3	(12)	3	(12)			3	(12)	100.0	(100.0)
Honduras	0	(4)	0	(4)			0	(4)	100.0	(100.0)
México	72	(187)	43	(98)	29	(89)	72	(187)	100.0	(100.0)
Nicaragua	3	(16)	1	(8)	2	(8)	3	(16)	100.0	(100.0)
Panamá	12	(59)	7	(29)	5	(30)	12	(59)	100.0	(100.0)
El Salvador	3	(19)	3	(19)			3	(19)	100.0	(100.0)
United States—EE.UU.	5	(6)	4	(5)	1	(1)	5	(6)	100.0	(100.0)
Venezuela	6	(56)	4	(29)	2	(27)	6	(56)	100.0	(100.0)
Vanuatu	2	(11)	2	(11)			2	(11)	100.0	(100.0)
Total	171	(655)[1]	109	(392)	62	(263)	171	(655)[1]	100.0	(100.0)

1 Includes 31 trips that began in 2010 and ended in 2011. In addition, there were five fishing trips of vessels with fish-carrying capacities equal to or less than 363 metric tons that were required to carry observers.

1 Incluye 31 viajes iniciados en 2010 y terminados en 2011. Además, eran cinco viajes de pescar de buques de capacidad de acarreo de peces igual o menor a 363 toneladas métricas requirieron llevar observador.